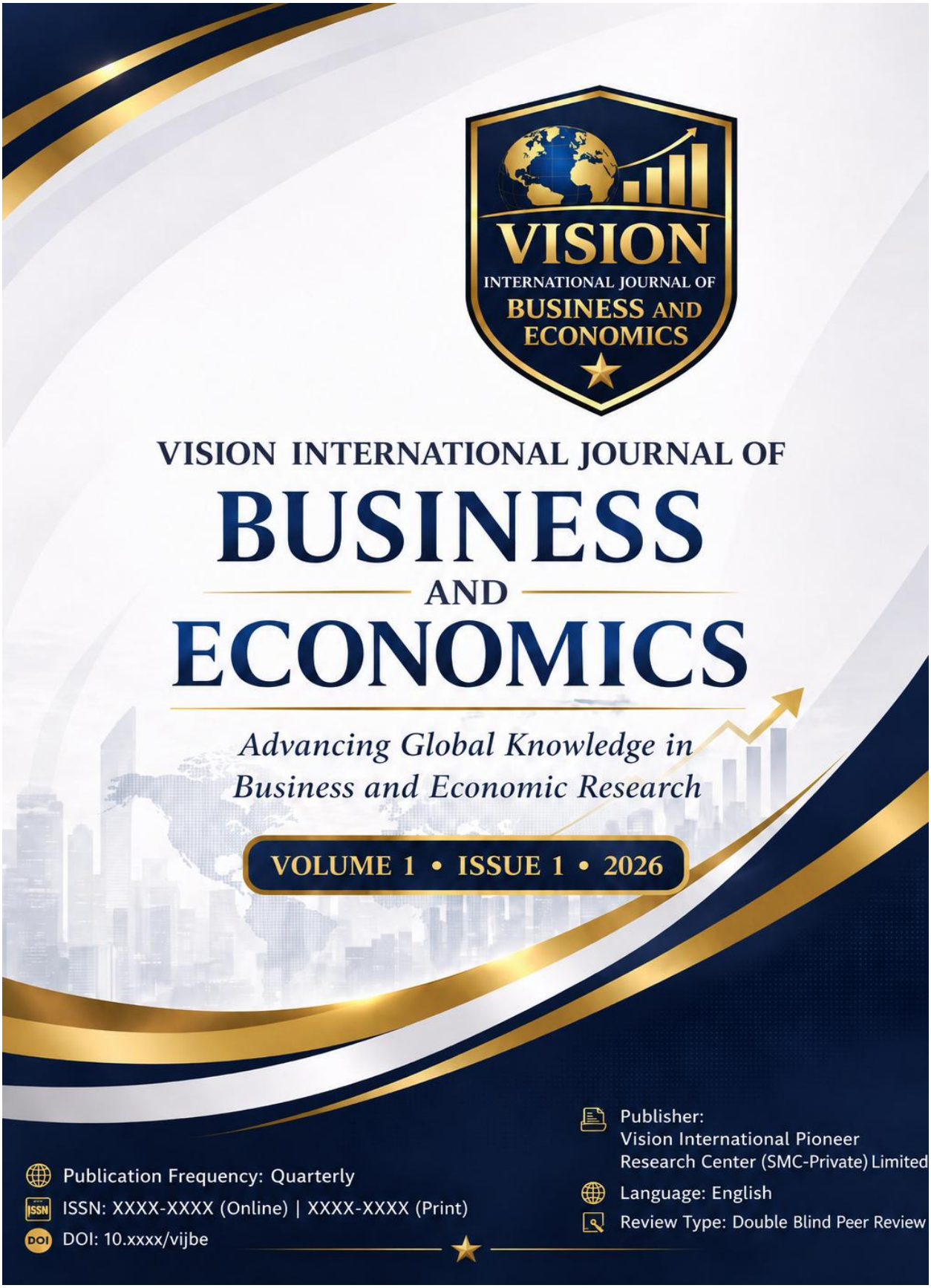


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Published by Vision International Pioneer Research Centre (SMC-PVT) Ltd

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Vision International Journal of Business and Economics

Volume 1, Issue 1, 2026, Pages 01 - 09

Journal Homepage: https://journals.viprc.org/index.php/vijbe/index

The Renewable Energy Adoption in Sustainability Practices for Sustainable Competitive Advantages in Pakistan Context

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ARTICLE INFO

Article History:

Received:	*February*	*28, 2026*
Revised:	*April*	*02, 2026*
Accepted:	*April*	*12, 2026*
Available Online:	*April*	*19, 2026*

Keywords:
Renewable Energy, Sustainability Practices, Sustainable Competitive Advantage, Pakistan

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ABSTRACT

The purpose of this paper is to find out the impact of renewable energy adoption on sustainable performance and sustainable competitive advantage (SCA) in the power sector of Pakistan. Data from 275 employees in Pakistan's power sector were analyzed using a quantitative method. The Statistical Package for the Social Sciences (SPSS) was used to analyze data collected from respondents' responses. Results from our study showed that renewable energy has positive effects on firm efficiency, cost reduction, and corporate reputation, which contribute to SCA. Our results show that renewable energy is important, as it supports firms in performing their sustainability functions while linking them to corporate objectives. As such, these results are useful for businesses that wish to position themselves positively in their markets by implementing sustainable practices. In addition, the results have shown how renewable energy contributes to long-term SCA and thereby expands the existing knowledge base regarding business sustainability and strategic management. Finally, we offer policymakers and business leaders guidance on implementing sustainability efforts.

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Introduction

Businesses use renewable energy to achieve both economic and environmental sustainability in a world that is sustainable. People across the globe are turning to renewable energy to reduce rising energy prices and address global warming. Pakistan's high energy costs and dependence on imports provide a compelling reason for companies to invest in renewable energy especially for those who have struggled financially. Governments implement policies that offer firms incentives to invest in renewable energy however, there has been little understanding of the overall impact of renewable energy use on firms. Therefore, this study will investigate business strategies and competitive positioning via the utilization of renewable energy. In addition to addressing this knowledge gap, this study will also inform government and business strategies for sustainability and long-term competitive positioning. As international focus on sustainability and accountability continues to grow, businesses are being forced to adopt policies that promote long-term environmental and economic success. Renewable energy can be integrated into company operations to meet sustainability objectives while creating a competitive advantage (Batool et al., 2024). However, technology-based and industrial companies must adapt to regulations, remain competitive, and focus on sustainability

(Khawaldeh et al., 2025). Batool et al. (2024), Hamed et al. (2023), and Khawaldeh et al. (2025) indicate that investment in renewable energy represents a sustainable competitive advantage for businesses. For companies, adopting renewable energy is necessary because energy use is one of the most significant sustainability issues. By investing in green energy, firms can potentially reduce costs, improve their reputations, comply with regulatory requirements, and attract customers (Hamed et al., 2023). The study investigated the impact of renewable energy on business sustainability practices and how corporate sustainability strategies can lead to the development of long-term competitive advantages. What is the effect of utilizing renewable energy on competitive advantage in sustainability practice? This question investigates the effects of integrating renewable energy into business strategy and the role of green energy in enhancing competitiveness within an environmentally conscious market. The study examines the influence of sustainability policies on competitive advantage through both direct and indirect paths, such as the adoption of renewable energy.

Literature Review

Renewable energy adoption and sustainability practices: Renewable energy will likely have large-scale impacts on sustainable development (Dato, 2018) as small businesses (SMEs) are capable of enhancing their own sustainability through implementing renewable energy options thus, they will reduce environmental impacts (air pollution, greenhouse gas emissions), waste generation, resource utilization, and optimize energy usage (Chen et al., 2022; Wang et al., 2025). The adoption of renewable energy technology is expected to significantly drive the incorporation of "green" practices across the supply chain and the business's operations. Therefore, the implementation of renewable energy technologies is anticipated to become one aspect of the organization's overall sustainability strategy, generating the adoption of additional "green" practices and a holistic sustainability strategy (Awamleh et al., 2024). Hence, this research proposes:

H1: Renewable energy adoption improves sustainable competitive advantages.

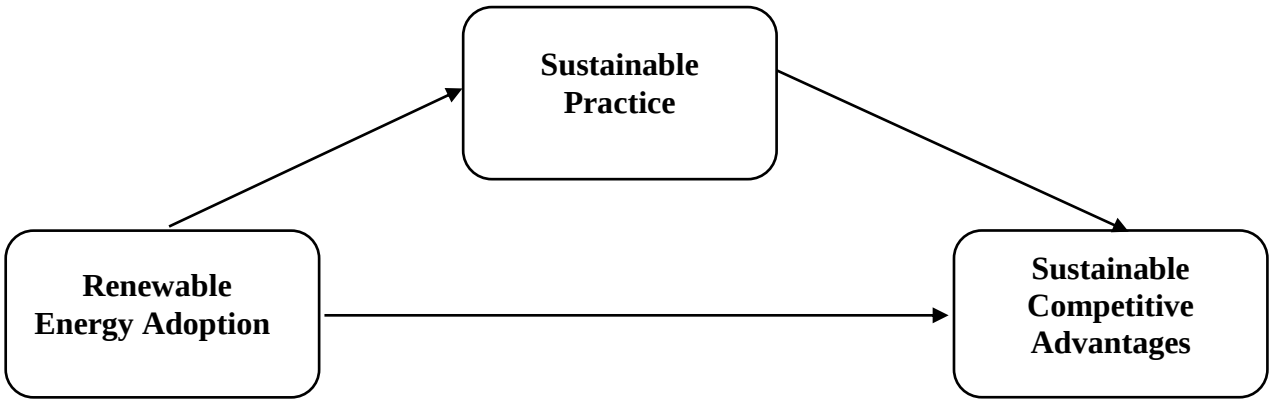
Mediating role of sustainable practice: Renewable energy use and adoption lead to improved “green” performance and cost efficiency for an organization. The strategic potential of renewable energy will be realized when it is implemented as part of an overall organizational sustainability strategy (Potrč et al., 2021). Although renewable energy reduces both energy consumption and greenhouse gas emissions from operations, the longer-term benefits will be most fully realized when it is used in combination with other elements of a sustainable business model. Elements of a sustainable business model could include reducing waste, improving resource efficiency, using sustainable or environmentally responsible suppliers or vendors, and implementing green marketing or branding programs to promote products and services. Such sustainable business models can help smaller organizations develop and implement long-term competitive advantages in the rapidly expanding global green marketplace (Thakkar, 2021; Ameer et al., 2024; Song et al., 2024). The implementation of a renewable energy-based sustainability plan may also provide an organization with opportunities to reduce costs, comply with existing environmental protection regulations, and develop new products and processes. In addition, combining renewable energy with other sustainability efforts will likely improve an organization’s reputation. Organizations which focus upon sustainability and incorporate renewable energy options into their sustainability plans will attract customers who purchase products and services based upon the sustainability characteristics of those products and services attract investors who support companies which have sustainability at the core of their mission and strategy and attract partners who support sustainability and wish to partner with like-minded organizations (Patil et al., 2025). Research indicates that developing and implementing sustainability plans may lead to increased consumer loyalty and trust, easier access to green financing, and other benefits. Therefore, organizations that adopt sustainability plans will potentially establish themselves as leaders in their industry segments over time (Haseeb et al., 2019). Additionally, implementing sustainable business models helps organizations mitigate risks associated with economic uncertainty and/or environmental uncertainty. Sustainable business models enable organizations to manage better risks associated with fluctuating commodity prices (e.g., fossil fuels), changes in government policies and regulations related to environmental issues (e.g., carbon pricing), and

other factors. Overall, a comprehensive sustainability strategy will enhance the effectiveness of renewable energy usage and create a sustainable competitive advantage. Incorporating renewable energy into a company's sustainability strategy will enhance the company's value, brand, and sustainability. As previously noted, a comprehensive sustainability strategy includes not only energy efficiency but also sustainable procurement practices, socially responsible corporate behavior, stakeholder participation in sustainability-related decision-making, etc. Therefore, this study hypothesizes:

H2: There are positive relationship of renewable energy on sustainable practice

H3: There are positive relationship of sustainable practice on competitive advantage.

H4: There are mediating role of sustainable practice in between renewable energy and competitive advantages.



Conceptual Model

Methodology

This research examines how a company can adopt renewable energy as part of its sustainability strategy to achieve a long-term competitive advantage in the Pakistani power sector. This research uses methodologies and analytical tools that have been developed over time, based on previous research using multidisciplinary articles written by F. Saddique & N Mushtaq et al. (2020 to 2026), in which survey instruments were distributed to employees of the Pakistani power generation industry. A total of 350 surveys were initially sent; however, only 275 were completed and returned.

Table 1: Variables, No. of Items, and Reference

Variable	Items	Reference
Renewable Energy Adoption	5	(Nauman et al., 2023)
Sustainability Practices	5	(Khalil et al., 2024)
Sustainable Competitive Advantage	6	(Fahad et al., 2023)

Table 2 shows that the Total Number of Respondents was 210. Of those, 65 were females. The respondents' ages were grouped into 5 categories. The largest group of respondents was aged 26-40 (n=110) as depicted in Table 2. 35 respondents fell into the less than 25 categories. As for qualifications, respondents were categorized into four groups. A large proportion of the sample (n = 120) had graduated from university, and a very small proportion (n = 25) had completed Matric. Regarding Experience, respondents were categorized into four groups. The largest percentage of respondents (n = 112) had 6 to 10 years of Experience, while the smallest percentage (n = 33) had more than 10 years of Experience.

Table 2: Sample Distribution

	Characters	F
Gender	Male	210
	Female	65
	Total	275
Ages	Below than 25	35
	26-40	110
	41-55	79
	Above 55	51
Qualification	Matric	25
	Intermediate	66
	Graduation	120
	Post Graduate	64
Experience	Less One Year	55
	From 1 to 5 years	75
	From 6 to 10 Years	112
	Above 10 years	33

The reliability test of each scale was examined using Cronbach's alpha all given values are above then 0.70. See table 3.

Table 3: Reliability Analysis

Variable	Cronbach's Alpha
Renewable Energy Adoption	0.79
Sustainability Practices	0.82
Sustainable Competitive Advantage	0.87

Correlation Analysis:

Table 4 presents the relationships that exist between the elements of this research. The relationship between Sustainability Practices and Renewable Energy Adoption shows a moderate to high positive correlation ($p = .00$; $r = 0.389$). Likewise, there is a moderate to high positive correlation between Sustainable Competitive Advantage and Renewable Energy Adoption ($p = .000$; $r = 0.390$). Lastly, the relationship between Sustainability Practices and Sustainable Competitive Advantage exists as a large to very large positive correlation ($p = .000$; $r = 0.413$).

Table 4: Correlation Analysis

Variables	**1**	2
1. Renewable Energy Adoption	1	
2. Sustainability Practices	0.389**	1
3. Sustainable Competitive Advantage	0.390**	0.413**

** Correlation is Shown Significant at 0.01 Level, *Correlation is Significant at 0.05 Level

Regression Analysis

The results in Table 5 represent an initial assessment of the relationship between renewable energy adoption and sustainable competitive advantage, using appropriate regression analysis. In addition, the model fit well, as indicated by an ANOVA P-Value of 0.05 or lower. Based on the R-Square of 0.123, it can be observed that each unit increase in renewable energy adoption results in approximately a 12.3% variance in sustainable competitive advantage. Additionally, the p-value for the coefficient is 0.00, which is less than 0.05; therefore, the relationship between the two variables is statistically significant. As demonstrated by the

estimated coefficient (B = 0.254), renewable energy adoption appears to affect sustainable competitive advantage. Therefore, hypothesis 1 is supported.

Table 5: Model between Renewable Energy Adoption and Sustainable Competitive Advantage

Variables	**R^2**	B	T	sig
Renewable Energy Adoption	0.123	0.254	8.86	0.000

Dependent Variable: Sustainable Competitive Advantage *p < 0.05.

Table 6 shows that regression analysis results are shown to determine whether sustainability practices are affected by renewable energy adoption. The model was determined to be valid based on the f-statistic p-value (.000) being < .05. Based on the r-squared (.192), a unit increase in renewable energy adoption will result in a 19.2% increase in sustainability practices. The coefficient's p-value (.000) is also below .05, indicating an association. The coefficient "B" has been estimated at .487. This indicates a positive relationship between renewable energy adoption and sustainability practices. Therefore, hypothesis no 2 is supported.

Table 6: Model between Renewable Energy Adoption and Sustainability Practices

Variables	**R^2**	B	T	Sig
Renewable Energy Adoption	0.192	0.487	9.23	0.000

Dependent variable: Sustainability Practices, *p < 0.05.

Table 7 shows that an initial regression analysis was conducted to assess the effect of Sustainability Practices on Sustainable Competitive Advantage. Since the ANOVA significance (sig) value for this table is 0.00 < 0.05, we have a good model. The R-Square Value of 0.212 indicates that if we increase Sustainability Practices by 1 unit, it will cause a 21.2 % change in Sustainable Competitive Advantage. The P-Value of the Coefficient (B), 0.00, is less than 0.05; thus, as indicated above, there is a statistically significant relationship between them. Therefore, B = .457 shows the extent to which Sustainability Practices impact Sustainable Competitive Advantage. In conclusion, Hypothesis 3 is supported.

Table 7: Model between Sustainability Practices and Sustainable Competitive Advantage

Variables	**R^2**	B	t	Sig
Renewable Energy Adoption	0.212	0.457	10.90	0.000

Dependent Variable: Sustainable Competitive Advantage, *p < 0.05

Mediation Analysis

The mediator variable was assessed by performing 1,000 bootstrap samples to obtain upper and lower limits for a 95% Confidence Interval. The mediation model indicated that sustainability practices mediate the relationship between renewable energy adoption and sustainable competitive advantage. An indirect effect (beta = .421; LL = .390; UL = .591; P < .01) existed; however, it was less than the direct relationship (beta = .112; P < .01). Therefore, since there is no "zero" value within the upper and lower bounds or limit of the confidence interval, the results provide support for Hypothesis H4.

Table 8: Mediation analysis using through Bootstrap

Relationships	***B***	***P***	**Bootstraps @ 95%**		**Hypotheses**
			LL	UL	
REA→SP→SCA					
Direct effect	0.112	***	0.178	0.267	
Indirect effect	0.421	***	0.390	0.591	

Note: REA= Renewable Energy Adoption, SP= Sustainability Practices, SCA= Sustainable Competitive Advantage, ***p<0.01

Discussion

In addition to encouraging the development of "green" practices throughout a company's supply chain and in general operations through the use of renewable resources, using renewable energy will most likely lead to a dramatic change in how companies develop sustainability programs. For example, if a company decides to incorporate renewable energy into its sustainability program, this can serve as one of many triggers for it to pursue or adopt even more "green" practices. As noted above, while the short-term benefits of reduced energy consumption and lower emissions from renewable energy will continue to exist so long as renewable energy is used, the long-term benefits of this form of energy are realized when they are included in a comprehensive sustainability strategy. Some ways renewable energy can contribute to this overall strategy include reducing waste, increasing resource efficiency, pursuing environmentally responsible purchasing practices in supply chain management, and establishing "green" marketing programs. These activities will enable small- and medium-sized enterprises (SMEs) to maintain their ability to adapt over time and remain competitive in increasingly "green" markets. To create these long-term advantages, a company must first establish a comprehensive sustainability strategy that includes a plan for renewable energy. This type of strategy will provide a company with cost-saving opportunities, support compliance efforts, and foster a culture of innovation.

Additionally, integrating renewable energy into a company's sustainability strategy will positively impact its reputation and image. Companies that focus on sustainability will attract customers who share similar values, investors who support businesses that make decisions based on social responsibility, and partners who are interested in working with organizations that conduct themselves ethically. According to research, companies that implement sustainability plans will experience increased customer loyalty and confidence, as well as improved access to funding through green financing mechanisms, thereby enhancing their long-term standing in the marketplace. Lastly, companies that operate under a sustainable business model will be better equipped to handle both economic and environmental uncertainty associated with fluctuating energy prices and changing regulations; thus, reducing the potential risks of using renewable energy sources. The integration of renewable energy into a company's sustainability strategy creates a sustainable competitive advantage. Companies that choose to integrate renewable energy into their sustainability strategy will enhance their value proposition, improve their brand, and reinforce their commitment to sustainability. As discussed above, all possible hypotheses are accepted.

Conclusion

Renewable energy use and sustainability practices drive competitive advantage in Pakistan's power sector. By using renewable energy, companies can develop sustainable business practices that enhance their competitive advantage. Organizations can achieve these enhanced competitive advantages by developing and implementing appropriate sustainability strategies. Policy makers and other organizations interested in promoting renewable energy development should implement programs to encourage the adoption of sustainable business practices and the sharing of knowledge and best practices.

Funding: Funding is inappropriate for this research study.

Data availability: The statistics supporting the outcomes of this research are accessible upon reasonable request from the first author.

Declarations

Ethical approval: Not applicable

Consent to participate: Not applicable

Consent to publish: All authors have given consent to publish.

Competing interest: The authors have no competing interests to declare.

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Vision International Journal of Business and Economics

Volume 1, Issue 1, 2026, Pages 10 - 21

Journal Homepage: https://journals.viprc.org/index.php/vijbe/index

Implementation of Strategic Decision-Making and Digital Technology to Attain Sustainable Performance in the Pakistan Context

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ARTICLE INFO

Article History:

Received:	*April*	*04, 2026*
Revised:	*April*	*25, 2026*
Accepted:	*May*	*09, 2026*
Available Online:	*May*	*20, 2026*

Keywords:
Strategic Actions, Digital Technology, Sustainable Performance, SMEs, Pakistan

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OPEN ACCESS

ABSTRACT

Advances in technology enable greater access to artificial intelligence (AI), machine learning, and virtual reality (VR) technologies. As such, firms will be required to utilize technological resources efficiently to maximize strategic management and resource utilization as access is simplified. In this study, we aim to investigate how technology influences digital-based strategic decisions and activities that ultimately influence a firm's sustainable competitive position. We surveyed 240 SMEs that employ significant levels of digital technology in their global operations and have a commercial presence in Pakistan. The SPSS Software is used for analysis. Our results demonstrate that adopting alternative strategies in technology and business model innovation significantly improve overall firm performance. Furthermore, our results show that implementing strategic actions will significantly influence sustainability in firms. This study contributes to the body of knowledge regarding the role of technology in enabling sustainable competitive positions by incorporating the following theories, the unified theory of technology acceptance and use, and the dynamic ambidexterity theory. Ultimately, this research supports integrating decision-making processes and digital technology to enhance organizational performance in increasingly complex international marketplaces.

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Introduction

As global marketplaces continue to evolve through technological advancements, it is becoming increasingly important for companies to develop the digital skills needed to compete effectively and achieve long-term growth (Verhoef et al., 2021). To meet the growing demand for these skills, the European Commission has developed the Digital Europe Program (DEP), a major initiative within its long-term digital strategy. With an allocation of €7.58 billion over the period from 2021 to 2027, this program seeks to increase Europe's digital sovereignty and resilience through investments into High Performance Computing, Artificial intelligence, cybersecurity, and advanced digital skills (European Commission, 2021). The DEP will encourage the public and private sectors to embrace digital transformation, thereby supporting Europe's position as a leader in sustainable and inclusive technology. By encouraging the take-up of digital technology, EU policies for Green Development, Digital Inclusion, and Innovation Capability will also be supported (Peñarroya-Farell & Miralles, 2021). Both the Dynamic Ambidexterity Theory (DAT) framework (Cozzolino & Verona, 2024) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) highlight the importance of environmental and institutional enablers in determining

whether a business adopts technology. Therefore, the Digital Europe Program is an essential vehicle for accelerating digital transformation within businesses and achieving sustainable performance in uncertain, rapidly evolving economies. Research studies have focused on Fitness & social media, Education Technology, and Agriculture & Financial Technologies (Chiu et al., 2024). Digital technology adoption has specific challenges and opportunities for both Born Global and Graduate internationalized businesses. Businesses with excellent capabilities for rapid entry into global markets through digital technologies are exceptional cases of dynamic ambidexterity. Being able to adapt quickly is critical for businesses and their employees to adopt new technology and be flexible across different global markets. Research papers indicate that there are currently two significant gaps in the literature on the digital transformation of international business performance. There is limited understanding of how foreign businesses use digital technology to improve efficiency and effectiveness (Zaid et al., 2025). Most often, the application of such technologies results in changes to organizational structures, enabling timely decision-making and increasing interaction with customers and stakeholders through real time communication via AI integration (Orlandi et al., 2025). There is a lack of research investigating how digitalization can improve organizational performance by enhancing capacity building, providing access to strategic resources, and increasing productivity and User Experience (Mazzoni & Sedita, 2025; Jawad et al., 2025; Aziz et al., 2025). Understanding these areas is vital for developing additional theoretical and practical insight regarding the appropriate digital transformation strategies for Multinational Organizations. Beginning with a focus on user experience, research based on the User Acceptance and Use of Technology (UTAUT) theories emphasizes how an organization's users, in addition to other organizational and environmental factors such as performance expectations, social influence, and enabling conditions, can encourage or discourage the adoption and effective use of digital technologies within organizations. Theories of strategic choice and internal organizational dynamics that lead to adoption in global and gradual internationalization organizations will be examined. While there has been considerable research in education, healthcare, fintech, e-commerce, and related areas on integrating theoretical models into international business and strategy, a significant opportunity exists to understand the effects of digitalization on the relationship between strategic choice and action. An application of the concepts of DAT and UTAUT may offer additional insight into how digital sophistication influences the strategic behaviors and long-term viability of organizations operating in increasingly globalized and technologically saturated markets. International growth strategies of traditional firms would also likely find value in applying UTAUT and DAT principles. Many firms that are growing internationally operate under several constraints. Often, they have rigid processes and structures that do not easily allow for rapid adaptation. The application of UTAUT and DAT could potentially enable traditional firms to address some of the technical issues associated with adopting technology. The prior literature emphasizes the importance of reducing user fears about new technology, facilitating its smooth adoption within an organization, and fostering a culture of ongoing learning and adaptation. While adapting mechanisms are important to organizations, recent research indicates that current efforts may require re-examination (Raisch, 2008). Due to its multi-level nature, ambidexterity is a potential area for social science investigation at all organizational levels (Birkinshaw & Gupta, 2013). Strategic actions and decisions are necessary to develop a comprehensive understanding of organizational behavior across different levels of analysis (to fill research gaps) and to develop a holistic view of organizational behavior (Wilden et al., 2018). The incorporation of dynamic ambidexterity, born global experiences, and techniques used by gradual internationalizes may assist firms in developing the ability to simultaneously maintain innovation while remaining agile in response to an ever-changing environment. The purpose of this study is to integrate the Dynamic Ambidexterity Theory (DAT) and the Unified Theory of Acceptance and Use of Technology (UTAUT) to assess the extent to which digital technologies influence the strategic decisions and sustainability of international firms. The purpose of this study is to identify how firm-specific and user-specific characteristics influence the rate and degree of adoption and internalization of digital technologies by born global and gradual internationalizes. The purpose of this study is to determine how digital sophistication affects strategic decision-making by identifying organizational and individual factors that contribute to digital transformation and increased competitiveness.

Literature Review

Strategic Actions are a Critical Variable for The Sustainable

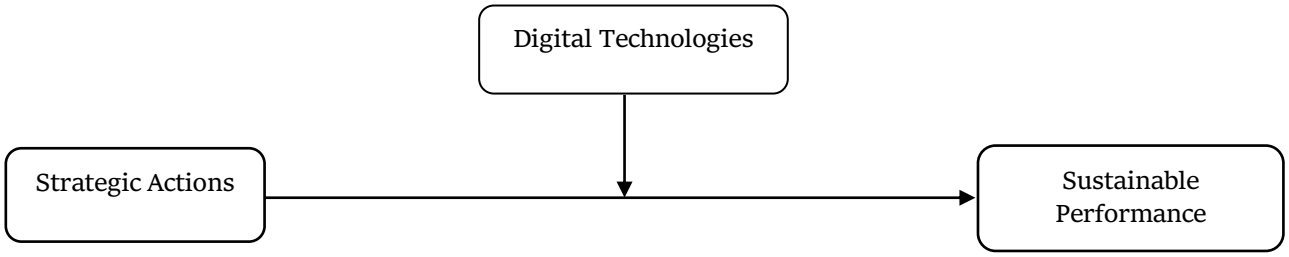
According to Bor et al. (2024), Strategic Actions can help support innovation projects through five forms of activity namely, signposting, demanding, incubating, orchestrating, and integrating. Indicating is an action that sets marketing objectives for the organization. Aspects of this activity involve identifying appropriate resources that meet sustainability criteria (e.g., decreasing plastic usage). As part of this activity, strategic actions affect customer behavior at the time of purchase and, thus, demonstrate that they impact each and every business subsystem. A high level of demand for a product may signal a new market trend or rapid customer adoption of technology, thereby influencing purchasing behavior and prompting businesses to react. Da Costa and Miragaia (2024) state that incubating involves testing pilot studies and experimenting with ideas. The incubation process uses data from previous tests to achieve environmentally friendly outcomes. Developing new materials may enhance manufacturing efficiency and create an eco-friendlier production line, resulting in a more sustainable production chain (Tankosić et al., 2024). Orchestrating is another form of strategic activity where companies launch and manage their innovative projects. In this case, the focus is on managing those projects through suitable industrial partners/suppliers to achieve the goals. Innovation may also require collaboration with other industry players and/or research organizations (Castelblanco et al., 2024). These strategic actions support innovation and knowledge development in all components (materials and subsystems) of the enterprise. As such, they have significant implications for Born Global enterprises as well. Enterprises that quickly internationalized through digital platforms need to build enhanced capacity for internationalization, support innovation, and adapt rapidly to changing global market conditions. Conventional enterprises may face barriers to adopting new technologies and enhancing their competitive position through these strategic actions. A past approach focused on eliminating new-user fear, integrating new technology into existing processes, and fostering a culture of continuous learning and adaptability. Both born-global and traditional internationalizing enterprises require strategic action. Strategic action provides the foundation for innovation, technology adaptation, and sustained success. Incorporating strategic action within an organization could help adapt to future changes in global markets, aiding in achieving long-term sustainability and competitive advantage. By creating competitive advantages and taking strategic initiatives to improve performance while responding to changing marketplace conditions, it is also possible. There has been extensive research conducted on the relationship between performance and business strategic action, employing various theoretical frameworks to understand the complex relationships involved (Posen et al., 2018; Wei et al., 2025; Kai et al., 2026). Typically, if a firm's performance does not meet expectations, it will implement additional strategic initiatives to improve performance. The purpose of these initiatives is to improve performance and rectify poor performance. Poor performance may encourage strategic innovation and change, prompting organizations to search for alternative methods (Kotiloglu et al., 2021). It is reasonable to conclude that there is a connection between performance and strategic decision-making. To minimize the risks of failure, small businesses with limited resources often eliminate high-risk actions once they experience underperformance. Limited financial resources and perceived risk levels play major roles in how an organization responds to subpar performance. Potential results of the literature include: Strategic activities foster innovation, which is necessary for adjusting to evolving marketplaces. The previously discussed activities help improve performance and enhance the organization's innovative capabilities (Wang et al., 2025). Once performance begins to fall short of expectations, a firm should focus on strategic efforts designed to transform its organization. Strategic decision-making involves innovation, resource configuration, and attention to supply chain management. There exists evidence of a relationship between resources and strategic activities. Companies with limited financial resources may utilize radical innovations to improve performance and expand strategic options (Manthiou et al., 2025). Companies that engage in strategic activities designed to facilitate technological innovation and integration may compete in global marketplaces. As per above discussion the following hypothesis is formulate.

H1: The strategic actions have positive relationship on the sustainable performance.

Mediation Role of Digital Technology

Digital technology has an extraordinary effect on modern society, especially in networks of information, which generate new behaviors that ultimately enhance both individual and organizational dynamics (Escofet, 2020). Additionally, the extensive use of digital technology has increased involvement, dissemination, and access to information across various aspects of modern society. Digital technology has dramatically affected the competitive landscape for businesses. The barrier to entry in many sectors has been greatly diminished by the use of digital technology, which has generated much higher levels of competition and imitation (Bansal et al., 2024). One aspect of digital technology has created research setting in which one can analyze its implications while investigating the relationship between digitalization and innovation. Firm technology enhances production, performance, and capabilities when combined with human capital (Mouazen et al., 2025). Advanced digital technologies negatively affect company dynamics and undermine value during decision-making. The dramatic influence of digital technology will affect a firm's competitive abilities. The significance of this is that many organizations are working diligently to survive and expand (Khodakivska et al., 2023). Firms need to understand decision-making processes and strategies for internationalizing to develop competitive advantages within markets. The majority of the literature focused on internationalization processes via exporting (Brown & Mawson, 2016). Utilizing digital technology could transform a firm's internationalization process and create new marketing and sales avenues in developing markets. Moreover, complex technologies can help firms expand their international operations by providing faster, more efficient methods for processing information. In resource-poor settings, digital technologies are necessary for organizations that have rapidly internationalized to participate in global marketplaces. Digital technologies provide effective global customer interaction and presence. Digital technologies assist born global in overcoming challenges associated with rapid internationalization, including high costs and logistical complexity, thereby expanding their global reach (Coad et al., 2021). On the other hand, Gradual Internationalizes benefit from digital technology and grow progressively. Digital solutions enable organizations to manage better their operations, communications, and supply chain relationships (Teruel et al., 2022). By leveraging digital technology, Gradual Internationalizes can respond to changing global marketplace dynamics and remain competitive with more agile competitors. Digital technology integration significantly affects the internationalization efforts of businesses worldwide and Gradual Internationalizes (Zaid et al., 2025). Digital technologies are essential for organizations seeking to compete globally, as they can improve market access, reduce costs, and enhance operational capabilities. Governments must foster an environment that promotes technological advancement, boosting enterprises' global competitiveness (Himani Srihita et al., 2025). Implementing digital technology is crucial for establishing strategies for global and multinational enterprises (Secinaro et al., 2025). This technology enables them to overcome progressive obstacles and logistical challenges. Digital platforms enable organizations to enter markets and leverage sophisticated marketing channels, enhancing client engagement. For enterprises with longer internationalization procedures, embracing digital technology offers significant advantages despite delayed growth. As per above discussion the following hypothesis is formulated.

H2: The Digital technologies has positive moderate relation among the strategic action and sustainable performance.



Conceptual Framework

Methodology

This research evaluates the influence of strategic actions on sustainable performance in small and medium enterprises (SMEs) in Pakistan. Digital Technology is a moderator for this research. The methodology used for the analysis is based on methods employed by previous authors in their multidisciplinary studies, as reported in papers published by F. Saddique & N Mushtaq et al. (2020 to 2026). The first employee questionnaires were distributed to employees of SME companies operating in Pakistan. A total of 400 employee questionnaires were delivered, but only 240 were returned.

Table 1: Variables, Sample Items and Reference

Variable	Items	Reference
Strategic actions	5	(Yun et al., 2024).
Sustainable Performance	5	Maletic et al., 2015)
Digital technologies	4	(Fahad et al., 2023)

The data in Table 2 show that 400 respondents completed the questionnaire, yielding an overall response rate of 240. Of these 400 respondents, 180 were male, and 60 were female. Regarding the respondents' age, they were grouped into four categories. As illustrated in Table 2, the largest group was respondents aged 26-40, with 111 respondents. In addition, Table 2 shows that, based on qualifications, the respondents could be placed into one of four categories. Specifically, the largest group of respondents had completed their education at the University level (115 respondents), while the smallest group was those still studying for Matric (21 respondents). Finally, based on work experience, the respondents could also be grouped into four different categories. Consistent with this classification, the largest group of respondents had 6 or 10 years of work experience, totaling 111, and the smallest group had less than a year of work experience, totaling 37.

Table 2: Sample Distribution

	Characters	F
Gender	Male	180
	Female	60
	Total	240
Ages	Less Than 25 Years	30
	From 26 to 40	111
	From 40 to 55	40
	Above 55	59
	Total	240
Qualification	Matric	21
	Intermediate	69
	Graduate	115
	Post Graduate	35
	Total	240
Experience	Below One Year	37
	1 - 5 years	55
	6-10 Years	101
	Above 10 years	47
	Total	240

The reliability test of each scale was examined using Cronbach's alpha. See table 3. All the above values are greater than 0.70, indicating that the measurements were accurate and acceptable for future research.

Table 3: Reliability Analysis

Variable	Cronbach's Alpha
Strategic actions	0.72
Sustainable Performance	0.73
Digital technologies	0.78

Correlation Analysis

Table 4 illustrates the associations among the factors in this study. Strategic actions are significantly and moderately correlated with sustainable performance (r = 0.278, p = 0.00). They are moderately and significantly correlated with digital technologies (r = 0.274, p = .000). In addition, the association between sustainable performance and digital technologies is moderate and statistically significant (r = 0.289, p = .000).

Table 4: Correlation Analysis

Variable	1	2	3
1. Strategic actions	1		
2. Sustainable Performance	0.278**	1	
3. Digital technologies	0.274**	0.289**	1

** Correlation is Shown Significant at 0.01 level, *Correlation is Significant at 0.05 level

Regression Analysis

Table 5 demonstrates the basic regression analysis performed to determine the impact of strategic action on sustainable performance. The model is fit since the ANOVA sig value is 0.00 < 0.05. The R-squared value of 0.129 indicates that a one-unit change in strategic action results in a 12.9% change in sustainable performance. The coefficient's p-value is 0.00, which is less than 0.05, indicating a significant association. The value of B is 0.252, indicating that strategic action affects sustainable performance. Hence, Hypothesis 1 is supported.

Table 5: Model between strategic action and sustainable performance

Variable	R^2	B	t	Sig
Strategic actions	0.129	0.252	8.89	0.000
Sustainable Performance				
Digital technologies				

Dependent Variable: Sustainable Performance * p < 0.05.

Moderation-Analysis

Table 6: Moderation-Analysis

Variables	*B*	R^2	*P*
Strategic Action (SA)	0.289	0.179	***
Digital Technologies (DT)	0.190	0.081	***
SAx DT	0.050	0.123	***

Note: Dependent Variable = Sustainable Performance

The results in Table 6 show that strategic actions affected sustainable performance (p < .01, β = .289), accounting for R^2 = .179. Additionally, as indicated by the beta coefficient, we find that digital technologies have a similar positive impact on sustainable performance (p < .01, β = .190), but to a lesser degree (R^2 = .081). Thus, there was an additional statistically significant interaction effect (β = .05, p < .01) for the product of the two variables (strategic action * digital technology), indicating that digital technologies

moderated the relationship between strategic action and sustainable performance. As such, the accepted hypothesis H2.

Discussion

According to Bor et al. (2024), Strategic Actions can help support innovation projects through five forms of activity namely, signposting, demanding, incubating, orchestrating, and integrating. Indicating is an action that sets marketing objectives for the organization. Aspects of this activity involve identifying appropriate resources that meet sustainability criteria (e.g., decreasing plastic usage). Da Costa and Miragaia (2024) state that incubating involves testing pilot studies and experimenting with ideas. The incubation process uses data from previous tests to achieve environmentally friendly outcomes. Developing new materials may enhance manufacturing efficiency and create an eco-friendlier production line, resulting in a more sustainable production chain (Tankosić et al., 2024). Orchestrating is another form of strategic activity where companies launch and manage their innovative projects. In this case, the focus is on managing those projects through suitable industrial partners/suppliers to achieve the goals. Innovation may also require collaboration with other industry players and/or research organizations (Castelblanco et al., 2024). These strategic actions support innovation and knowledge development in all components (materials and subsystems) of the enterprise. As such, they have significant implications for Born Global enterprises as well. Strategic action provides the foundation for innovation, technology adaptation, and sustained success. Incorporating strategic action within an organization could help adapt to future changes in global markets, aiding in achieving long-term sustainability and competitive advantage. By creating competitive advantages and taking strategic initiatives to improve performance while responding to changing marketplace conditions, it is also possible. There has been extensive research conducted on the relationship between performance and business strategic action, employing various theoretical frameworks to understand the complex relationships involved (Posen et al., 2018). Typically, if a firm's performance does not meet expectations, it will implement additional strategic initiatives to improve performance. The purpose of these initiatives is to improve performance and rectify poor performance. Poor performance may encourage strategic innovation and change, prompting organizations to search for alternative methods (Kotiloglu et al., 2021). The previously discussed activities help improve performance and enhance the organization's innovative capabilities (Wang et al., 2025). Once performance begins to fall short of expectations, a firm should focus on strategic efforts designed to transform its organization. Strategic decision-making involves innovation, resource configuration, and attention to supply chain management. There exists evidence of a relationship between resources and strategic activities. Companies with limited financial resources may utilize radical innovations to improve performance and expand strategic options (Manthiou et al., 2025). Companies that engage in strategic activities designed to facilitate technological innovation and integration may compete in global marketplaces. Digital technology has an extraordinary effect on modern society, especially in networks of information, which generate new behaviors that ultimately enhance both individual and organizational dynamics (Escofet, 2020). Advanced digital technologies negatively affect company dynamics and undermine value during decision-making. The dramatic influence of digital technology will affect a firm's competitive abilities. The significance of this is that many organizations are working diligently to survive and expand (Khodakivska et al., 2023). Firms need to understand decision-making processes and strategies for internationalizing to develop competitive advantages within markets. The majority of the literature focused on internationalization processes via exporting (Brown & Mawson, 2016). On the other hand, Gradual Internationalizes benefit from digital technology and grow progressively. Digital solutions enable organizations to manage better their operations, communications, and supply chain relationships (Teruel et al., 2022). By leveraging digital technology, Gradual Internationalizes can respond to changing global marketplace dynamics and remain competitive with more agile competitors. Digital technology integration significantly affects the internationalization efforts of businesses worldwide and Gradual Internationalizes (Zaid et al., 2025). Digital technologies are essential for organizations seeking to compete globally, as they can improve market access, reduce costs, and enhance operational capabilities. Governments must foster an environment that promotes technological advancement, boosting enterprises'

global competitiveness (Himani Srihita et al., 2025). Implementing digital technology is crucial for establishing strategies for global and multinational enterprises (Secinaro et al., 2025). This technology enables them to overcome progressive obstacles and logistical challenges. Digital platforms enable organizations to enter markets and leverage sophisticated marketing channels, enhancing client engagement. For enterprises with longer internationalization procedures, embracing digital technology offers significant advantages despite delayed growth as per above discussion, all the hypothesis are accepted.

Conclusions

In this study, we aim to investigate how technology influences digital-based strategic decisions and activities that ultimately influence a firm's sustainable performance. So, that the result of study represented that strategic action has positive influence on the sustain performance in SME of Pakistan. Furthermore, the digital technologies has positive moderate role in strategic actions and sustainable performance to attain the competitive advantages. The study helpful for policy makers, business owners and SME managers.

Funding: Funding is inappropriate for this research study.

Data availability: The statistics supporting the outcomes of this research are accessible upon reasonable request from the first author.

Declarations

Ethical approval: Not applicable

Consent to participate: Not applicable

Consent to publish: All authors have given consent to publish.

Competing interest: The authors have no competing interests to declare.

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Vision International Journal of Business and Economics

Volume 1, Issue 1, 2026, Pages 22 - 30

Journal Homepage: https://journals.viprc.org/index.php/vijbe/index

Artificial Intelligence Adoption and Organizational Effectiveness: The Mediating Roles of Service Quality and Customer Satisfaction

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ARTICLE INFO

Article History:

Received:	*March*	*12, 2026*
Revised:	*April*	*19, 2026*
Accepted:	*June*	*02, 2026*
Available Online:	*June*	*07, 2026*

Keywords:

Artificial Intelligence Adoption, Service Quality, Customer Satisfaction, Organizational Effectiveness, Service Industry, Structural Equation Modeling

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OPEN ACCESS

ABSTRACT

The adoption of artificial intelligence (AI) has revolutionized the service industry by improving efficiency, decision-making, and customer experience. AI-driven tools such as chatbots, recommender systems, and predictive analytics have become increasingly essential for organizations seeking to enhance service operations and streamline business processes. This study examines the indirect impact of AI adoption on organizational effectiveness by investigating the mediating roles of service quality and customer satisfaction. AI adoption enables organizations to improve service delivery by reducing response times, personalizing customer interactions, and enhancing the overall service experience. Improved service quality is expected to increase customer satisfaction, which, in turn, enhances organizational effectiveness. This study employs a quantitative survey research design. Data are collected from customers and service managers of service organizations that utilize artificial intelligence technologies. A structured questionnaire based on validated measurement scales is used for data collection. Respondents are selected using a combination of convenience and purposive sampling techniques. Data are analyzed using SmartPLS software, including reliability and validity assessments as well as Structural Equation Modeling (SEM). The mediating effects of service quality and customer satisfaction are examined using the bootstrapping approach. This study contributes to the literature on service marketing and digital transformation by providing insights into how AI adoption enhances organizational effectiveness through customer-centric mechanisms.

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Introduction

In recent times, artificial intelligence (AI) has proven to be a game-changer that is revolutionizing the service sector across the globe. As AI technology becomes more sophisticated and accessible, the ways in which organizations can leverage it for efficiency, automation, and customer experience are becoming more diverse. The potential applications of AI systems for efficiency, automation, and customer experience are growing, making them increasingly adopted by organizations. AI adoption involves the use of intelligent technologies that can make predictions, personalize and automate decisions (Russell & Norvig, 2020). AI is a key player in customer interaction, especially in the service sector, with chatbots, virtual assistants and recommendation systems improving customer service delivery (Davenport & Ronanki, 2018).

Organizational effectiveness is the efficiency of an organization to attain its goals and sustainability with high performance. This encompasses financial results, operational efficiency, service quality and customer

satisfaction (Richard et al., 2009). In service-based organizations, customer experience and the customer's perception of the quality of the service are crucial factors to effectiveness, and AI is critical in improving the outcomes of services (Sardesai et al., 2024).

On the other hand, service quality is one of the most important factors contributing to the customer's perception of service in the service sector. This is the difference between what customers expect and what is provided. The dimensions of service quality mentioned by Parasuraman et al., (1988) are reliability, responsiveness, assurance, empathy and tangibles. AI technologies augment the high quality of customer service by allowing for quicker responses, custom suggestions, and round-the-clock customer support systems.

Satisfied customers are the other important measure of service quality and it is an important contributor to the achievement of organization's success. It is defined as how well the service providers' expectations are met or exceeded by the customers (Oliver, 1997). Satisfied clients are more likely to be loyal to the organization, to buy services again and to tell others about the organization. In today's digital age, customers are more likely to be satisfied when the app can personalize and tailor their interactions with the service, thanks to AI (Hui et al., 2024; Prentice et al., 2020).

There is growing interest in the literature of service marketing and information systems in the relationship between organizational effectiveness and the use of AI. The overall aim of AI systems is to increase the efficiency of operations, minimize service delays, and boost customer interaction, thereby driving the success of the organization (Huang & Rust, 2018; Mahboub & Ghanem, 2024). The effects of AI, however, don't always manifest in the direct way, and can be filtered by the service's quality and level of satisfaction with the service. The quality of service is a pivotal factor that can shape the impact of AI implementation within an organization. AI-powered systems guarantee regular and precise service provisioning, minimizing human mistakes and enhancing reliability. Zeithaml et al., (1996) found that high service quality leads to increased organizational performance and customer retention.

This relationship is further reinforced by customer satisfaction, which can be seen as a reflection of the service quality provided to the customers and can be converted into customer loyalty in the long run and organizational success. Oliver (1997) cited that customer satisfaction can be defined as psychological response which influences future buying decision and brand loyalty. AI-powered systems can provide customization, convenience, and timely customer service, leading to higher satisfaction in AI-dominated environments. The service quality theory and expectation-confirmation theory are the theories used to provide theoretical support for this study. Service quality theory (Oliver, 1980) describes the relationship between how the service is performed and customer satisfaction and expectation-confirmation theory describes the process of customer satisfaction when expectation is met or exceeded.

This study is designed to investigate the influence of the adoption of artificial intelligence on the effectiveness of the organization with the mediating role of service quality and customer satisfaction. The research methodology adopted is quantitative and the data gathered will be from customers and service managers of AI enabled organizations. The analysis of the data is carried out using the software SmartPLS to test the direct relationship and indirect relationship. The results will be highly useful for the academic world and for managers, in terms of understanding the improvement of organizational effectiveness by means of customer experience mechanisms through the use of AI technologies.

Literature Review

The concept of artificial intelligence (AI) has emerged as a key driver of transformation in the service sector, revolutionizing the way service providers engage with customers, provide services, and optimize operations. AI adoption means using intelligent systems that are able to carry out cognitive functions like prediction, automation, personalisation, and decision making support (Russell & Norvig, 2020). For example in the

service industry, artificial intelligence has improved customer interaction and responsiveness through the use of chatbots, recommendation systems, and intelligent assistants (Davenport & Ronanki, 2018).

The evaluation of the effectiveness of the organization is now gaining importance especially in the service sector, both from the internal efficiency and external perspective from the customers. It portrays the level of success or failure in the attainment of desired objectives like profitability, service excellence or customer retention (Richard et al., 2009; Abbas, 2025). In the modern service industries, the qualities of service and customer satisfaction are important measures of organizational effectiveness, which are determined by the level of customer experience. Service quality is one of the most widely studied constructs in literature of marketing and service management. The five dimensions of SERVQUAL service quality model are reliability, responsiveness, assurance, empathy and tangibles. AI technologies can boost service quality by making services faster, more accurate, more consistent and more personalized (Huang & Rust, 2018).

Customer satisfaction is strongly related with service quality and it is defined as the emotional and cognitive reaction(s) of customers following the examination of service experiences (Oliver, 1997). Customers who are satisfied are more likely to be loyal to the company, come back for additional purchases and to recommend it to others. Personalization in interactions and smooth digital experiences play a major role in customer satisfaction in AI-powered contexts (Grewal et al., 2017; Bharadwaj et al., 2025).

The use of AI has been acknowledged as another crucial factor for the transformation of services. It can be useful in reducing human errors, improving the efficiency of services, and providing customer support systems (Rust & Huang, 2014). The impact of AI on the effectiveness of an organization is, however, not only technical but is also mediated through the customer's perception and reaction (service quality, customer satisfaction).

The quality of services becomes a key determinant between successful AI implementation and its impact on organizational effectiveness. AI systems are also used to improve the quality of the services provided, by automating tasks, anticipating customer needs and react promptly to them, which consequently resulted in increased satisfaction with the quality of the services provided by the customer (Bitner, 1990). Zeithaml et al., (1996) reveal that when services are higher in quality, it results in better customer retention and organization performance.

This is enhanced by customer satisfaction that leads to customer loyalty. Oliver (1997) commented that satisfaction is one of the factors that affect the next decision of the customer to reorder and give recommendation for the product. An AI-driven service environment makes for a more fulfilling experience for customers through personalization, convenience and faster responses. The relationship between causation of service quality to customer satisfaction is well documented and supported in the service marketing literature. When service is high, satisfaction is high and as a result, the organization is effective. In an AI-driven world where customer experience is shaped by continuous digital engagement, this back-and-forth process holds great significance. While there has been growing research around the topic of adoption of AI, the majority of studies have focused on the efficiency of the operations rather than outcomes for customers. A lack of research exists that discusses how AI can facilitate organizational effectiveness in terms of service quality and customer satisfaction as a context. This is very lacking in the literature.

Furthermore, the emphasis is placed on service quality or customer satisfaction and not on the service chain. But in an AI service environment, the quality of the service becomes a factor that results in customers' satisfaction and satisfaction in organizational effectiveness. This study was theoretically supported by the expectation-confirmation theory and service quality theory. Satisfaction is more satisfactions when customer's expectation is confirmed or exceeded (Oliver, 1980), service quality theory can be explained the customer's response to the service performance (Parasuraman et al., 1988). Another area of significance is the improvement of customer experience management with the help of AI technologies. They enable businesses to collect and handle client information when it comes in to offer tailored services and predict problems (Huang & Rust, 2018).

Moreover, the literature on digital transformation highlights the importance of the ability of AI to improve the customer experience and responsiveness in operations, which are key factors in service quality (Chatterjee & Kar, 2020; Alqasa, 2023). Sustained competitive advantage is more likely to be gained by organizations that are effective in incorporating AI into their service processes. The reputation and image of the organization is also linked to the quality of service. Through delivering a high-quality service, trust is created with the customers, and this is key to the long-term success of an organization (Wirtz & Lovelock, 2018). AI systems help to standardize service processes, minimizing variability and consistency.

Customer satisfaction has been shown to be an indicator of customer loyalty and organization profitability as well. A stream of revenue is established when customers are satisfied (Grewal et al., 2017; Neiroukh et al., 2025). This relationship is further reinforced by creating personalized experiences for each customer with AI personalization. The overall literature review indicates that the use of AI is not the sole solution to enhance organizational effectiveness. Its impact is significantly magnified in terms of service quality and customer satisfaction. However, there is less empirical evidence that have investigated these constructs as a sequence - mediated model in an AI-assisted service environment.

Methodology

Research Design

The quantitative research approach and survey method were employed in the study to gain insight into the impact of the application of artificial intelligence (AI) on the effectiveness of the organization mediated by the service quality and customer satisfaction. A reason for the selection of the design was that it would enable the relationships between variables to be tested empirically using statistical techniques.

Population and Sample

The study's participants were customers and service managers for AI-enabled companies in the service sector. These respondents were chosen as they have direct experience with AI-based service systems and processes of customer interaction. A total of 200 respondents were included in the final sample.

Sampling Technique

Convenience and purposive sampling techniques were used. The sampling methods used were convenience sampling for the customers who utilize the AI-based services regularly, and purposive sampling for the service managers having some professional experience in the AI-based services.

Data Collection Procedure

The structured questionnaire was developed based on previously validated scales from the literature of AI adoption, service quality, customer satisfaction and organizational effectiveness. The questionnaire was sent out by both email and post. The participants were briefed on the purpose of the study and their responses were kept confidential. Completed questionnaires were the only ones used in the final data set.

Measurement of Variables

All constructs were rated with a yes/no scale from 1 strongly disagree to 5 strongly agree. The indicators for measuring the adoption of AI included automation, personalization, and integration with digital services. The SERVQUAL dimensions (reliability, responsiveness, assurance, empathy, tangibles) were employed to assess the service quality. Measuring customer satisfaction was done in terms of overall satisfaction, expectation confirmation and service experience. The operational efficiency, customer retention and service performance were used to judge the effectiveness of the organizations.

Data Analysis Technique

The collected data were analyzed using the software "SmartPLS". Descriptive statistics were used along with reliability test, validity test, and Structural Equation Modeling (SEM) for testing the hypothesized relationship.

Assessment of Reliability and Validity

The reliability was evaluated with Cronbach's alpha and composite reliability, and the convergent validity was evaluated with Average Variance Extracted (AVE). The Fornell-Larcker criterion and cross-loadings were used to assess the discriminant validity to test construct distinctiveness.

Structural Equation Modeling (SEM)

The direct effects of the adoption of AI on organizational effectiveness and the indirect effects on customer satisfaction via service quality were examined using Structural Equation Modeling (SEM).

Mediation Analysis

The mediating effects of service quality and customer satisfaction were tested using the bootstrapping technique in SmartPLS. The sequential mediation was used to see if the use of AI firstly increased the quality of the services offered, and then customer satisfaction and finally organizational effectiveness. A mediation effect was deemed to be significant if the confidence intervals did not contain the null hypothesis value.

Analysis

The analysis of the collected data from 200 respondents (customers and service managers of service organizations using AI) has been done by applying SmartPLS. The study sought to explore the relationships between the adoption of artificial intelligence (AI), service quality, customer satisfaction and organizational effectiveness. The data was checked for missing items, inconsistencies in the responses and outliers before being analyzed. All 200 responses were included in the final data analysis after data cleaning. The analysis included four main parts: (1) descriptive statistics, (2) assessment of the measurement model, (3) assessment of the structural model, and (4) mediation (bootstrapping) analysis.

Descriptive Analysis

Demographic and organizational characteristics of the respondents were summarized using descriptive statistics. It covered AI-serviced service managers as well as customers of AI-serviced services. The majority of respondents reported frequent usage of AI-driven service systems like chatbots, mobile applications, and automated customer support systems.

Table 1: Demographic Profile of Respondents (N = 200)

Variable	Category	Frequency	Percentage
Gender	Male	118	59%
	Female	82	41%
Age	18–30 years	64	32%
	31–40 years	78	39%
	41–50 years	42	21%
	Above 50 years	16	8%
Role	Customer	122	61%
	Service Manager	78	39%
Sector	Banking/Finance	68	34%
	Telecom	72	36%
	E-commerce/Services	60	30%

As shown in the demographics profile, respondents' distribution by service sector was fairly even, providing a wide range of AI usage experiences.

Measurement Model Assessment

Measurement model was tested to check the reliability and validity of the constructs. In order to test the internal consistency of the scales, Cronbach's alpha was used and the Average Variance Extracted (AVE) was used to evaluate the convergent validity. All the values were higher than recommended values (AVE ≥ 0.50, reliability ≥ 0.70), and the data showed good convergence and reliability. The Fornell-Larcker criterion was used to confirm the discriminant validity; that is, each construct was statistically distinct.

Table 2: Reliability and Validity Results

Construct	Cronbach's Alpha	Composite Reliability	AVE
AI Adoption	0.918	0.940	0.703
Service Quality	0.902	0.931	0.676
Customer Satisfaction	0.895	0.924	0.661
Organizational Effectiveness	0.911	0.938	0.689

Structural Model Assessment (Direct Effects)

Results of the structural model showed strong relationships between all the variables. The adoption of AI had a significant positive impact on service quality, highlighting the role of AI systems in enhancing the reliability, responsiveness, and personalization of services. Additionally, customer satisfaction was significantly affected by AI adoption, indicating that better service automation and personalization contributes to better customer experience. Furthermore, service quality also had a significant positive effect on customer satisfaction, thus acknowledging that higher service quality results in higher satisfaction level. Service quality and customer satisfaction were found to have both significant positive impacts on organizational effectiveness, thus suggesting that customer-related enhancements contribute to organizational success. The indirect effects of mediators were also stronger and had direct positive influence on organizational effectiveness with the use of AI.

Table 3: Structural Model Results (Direct Effects)

Relationship	Beta	T-Value	P-Value	Result
AI → Service Quality	0.651	11.382	0.000	Supported
AI → Customer Satisfaction	0.512	8.764	0.000	Supported
Service Quality → Customer Satisfaction	0.439	7.921	0.000	Supported
Service Quality → Organizational Effectiveness	0.403	6.812	0.000	Supported
Customer Satisfaction → Organizational Effectiveness	0.478	8.104	0.000	Supported
AI → Organizational Effectiveness	0.297	5.624	0.000	Supported

Mediation Analysis (Sequential Effects)

The findings of the bootstrapping analysis indicated a significant mediation effect between community awareness and health insurance uptake with health screening. Indirect influence of AI on organizational effectiveness was through service quality and customer satisfaction, in a sequential path. In particular, the enhanced service quality led to greater customer satisfaction, this increased organizational effectiveness as a result of AI. The indirect effect was found to be statistically significant by excluding the value of zero from the confidence intervals, thus supporting the strength of the mediation model.

Explanatory power (R-Square values)

The R-squared values were high, which showed good model explanatory power. The variance in service quality was found to be a significant predictor of variance in customer satisfaction, and AI adoption was

found to explain a large amount of variance in service quality. These constructs accounted for a substantial amount of the variance in organizational effectiveness.

Discussion

Based on the results of this study, the use of artificial intelligence (AI) has a significant impact on the effectiveness of the organization both directly and indirectly via service quality and customer satisfaction in the field of service industries. The significance of this has been again the message that AI isn't merely a technology; it's additionally a customer experience (CX) transformation resource that changes the way organizations deliver worth. Finally, the positive relationship between organizational effectiveness with AI might be confirmed by past research that indicated AI's positive influence on operational efficiency and quick decision making (Huang & Rust, 2018; Davenport & Ronanki, 2018) and its positive effect on service automation.

The results also suggest that there is a positive correlation between the use of AI and the quality of service. That translates to AI-driven tools like chatbots, predictive analytics and automated service platforms for more reliable, more responsive and more personalized service. The outcomes are also similar to those reported by Parasuraman et al., (1988) who emphasized that the consistency and responsiveness of its service delivery was important for service quality. The use of AI technology minimizes human error and increases the accuracy of services, leading to better service quality perceptions.

The service quality was also found to be significant in affecting customer satisfaction, which stresses the idea that the quality of services offered directly impacts on customers' satisfaction. This proved to be in agreement with Oliver (1997), who suggested that if it is what they are expecting or better they will regard the service as good. Customers are satisfied when they can interact with the environment using AI which responds in real-time, and can adapt their interactions to that environment (Grewal et al., 2017).

From the findings of this research it was found that there is positive and strong relationship between Customer Satisfaction and organizational effectiveness. This translates to customers who are happy contributing to positive business outcomes such as customer loyalty, retention and profitability. This is in line with Zeithaml et al. (1996) research which demonstrated a one-to-one relationship between customer satisfaction and behavioural intentions and organizational success.

Based on sequential mediation findings, AI adoption mediated between organizational efficiency and service quality, vulnerable variables, in the following sense: It was a common middle path that led from the first variable to the second. More specifically, AI can enhance the quality of service, thus increasing customer satisfaction, and consequently, organizations' performance. The sequential mechanism underlines the importance of pathways that are customer-centered in understanding the impact of digital technologies. The conclusions of the study based on theoretical considerations can be its results can be evidence that expectation confirmation theory and service quality theory is fulfilled. However, explaining the relationship between perceived service performance, satisfaction and behavioral outcomes, the service quality theory (Parasuraman et al., 1988) can be used, which is linked to the confirmation theory (Oliver, 1980), which explains the formation of satisfaction. From a dynamic perspective, companies can start from the traditional service system and turn it into an intelligent service system of artificial intelligence facts and automation. However, not all this influence results from one of the technologies, it is also one of the perceptions and reaction of the customer to the improved services. This only further illustrates the idea of "capturing technology": the experience management of the customers. The results suggest that AI for service organizations can provide value beyond just operational efficiencies, in terms of enhancing service quality and customer satisfaction. This emphasizes the need to link the customer and tech into an effective organization.

Conclusion

From the results of this research, the conclusion can be drawn that the use of artificial intelligence at a high level is beneficial in the efficiency of the organization in service business sector. That said, this connection doesn't single handedly exist, however additionally it is much tempered by the quality of the service and the satisfaction of the clients. AI optimizes service delivery processes, enhancing service quality, which results in improved satisfaction which in turn is driving the decision making in the organization. Optimization of the service delivery processes with the aid of AI bandwidths; creates better service quality which can lead to higher customer satisfaction which in turn is driving make in the organization. As a new tool opens the door to improved efficiency, it is vital for any organization to, in addition to adopting AI, focus on delivering relevant service experiences, and enhance customer satisfaction.

Recommendations

To deliver services more efficiently, entities need to be armed with the latest in AI technologies such as chatbots, recommendation engines, and predictive analytics. The use of technology however needs to be correlated with the customer experience program so that the customers feel the improvement in the perceived service quality. Services have to continue to collect and enhance data related to the size of their services, responded-ness, dependability and individualization to enhance level of satisfaction. Employee education for working alongside AI systems will further enhance the outcomes of the services. Managers should focus on creating seamless and personalized customer experience, integrating AI systems and customer relationship management strategies into this process. Then there is the need for a feed forward iteration to continually enhance services delivered by organizations using AI. The successful adoption of technology and enhancement of the customer experience should be one of the primary priorities of digital transformation efforts to be promoted by both policymakers and industry players. Another expansion of the model can be made by studying some other mediators that have yet to be explored like trust perceived value and customer engagement.

Declarations

Ethical approval: Not applicable

Consent to participate: Not applicable

Consent to publish: All authors have given consent to publish.

Competing interest: The authors have no competing interests to declare.

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Vision International Journal of Business and Economics

Volume 1, Issue 1, 2026, Pages 31 - 48

Journal Homepage: https://journals.viprc.org/index.php/vijbe/index

Intrapreneurship: Customer-Centric Approach in Improving Passenger Loyalty via Mediating Customer Experience and Moderating Customer's Airline Reputation

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ARTICLE INFO

Article History:

Received:	*March*	*21, 2026*
Revised:	*April*	*26, 2026*
Accepted:	*June*	*08, 2026*
Available Online:	*June*	*17, 2026*

Keywords:
Customer-centric intrapreneurship, passenger loyalty, customer experience, airline reputation, Service-Dominant Logic

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ABSTRACT

This study examines how customer-centric intrapreneurship influences passenger loyalty in the commercial aviation industry, with customer experience serving as a mediating variable and airline reputation as a moderating factor. The research adopts a quantitative, cross-sectional design, collecting primary data from commercial airline passengers through a structured self-administered questionnaire. Grounded in Service-Dominant Logic theory, the study employs Partial Least Squares Structural Equation Modeling to test the hypothesized relationships among the constructs. The findings reveal that customer-centric intrapreneurship significantly and positively influences both customer experience and passenger loyalty directly. Customer experience also emerges as a significant predictor of passenger loyalty. Furthermore, customer experience partially mediates the relationship between customer-centric intrapreneurship and passenger loyalty, indicating that innovative employee behavior enhances loyalty both directly and through improved service experiences. This study contributes to Service-Dominant Logic literature by empirically demonstrating that employee-driven innovation creates value through both experiential and direct pathways, while challenging the assumed moderating role of organizational reputation within the aviation context. The findings offer practical implications for airline management, suggesting that investments in frontline innovation programs yield returns through multiple channels. Additionally, reputation management should be pursued as an independent strategic priority rather than assumed to automatically reinforce experience-based initiatives. The study acknowledges limitations including its cross-sectional nature, geographically concentrated sample, and measurement concerns regarding the passenger loyalty scale, recommending future research adopt longitudinal designs, incorporate behavioral loyalty indicators, and test the model across diverse demographic and geographic contexts.

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Introduction

Background of the Study

1 In the aviation industry, one of the fastest-moving sectors of service is now one in which airlines are always striving to find new ways to lure and keep passengers. Competition, technology, changing customer expectations and globalization of the markets have all changed the nature of competition from being price driven to customer driven and service driven. Consequently, airlines are now focusing more

on customer-centric strategies and prioritizing customers' needs and expectations by providing better service experiences.

2 The capability of the organization to implement their customer-centric intrapreneurship has become an important skill of the employees that can help them to develop innovative ideas, deliver better services and create value for the customers. Customer-centric intrapreneurship goes beyond the traditional approach to innovation, empowering employees to think creatively about the challenges their customers are facing, and proactively come up with innovative solutions that improve the customer's travel experience. The frontline staff in the airline industry including passenger services staff, cabin crew and airport staff are key to the successful adoption of innovative service practices which directly affect the perception of service quality of the passengers (Salah & Abou-Shouk, 2019).

3 In the modern day's airline market, customer experience is one of the most powerful factors influencing passenger behavior. Chanpariyavatevong et al. (2021) all transactions carried out by the airline passengers from ticket booking to receiving their bags are part of the travel experience. Customers Are Satisfied, They Create Emotional Bond, and They Stick with An Airline When They Have Positive Experience. For these reasons, airlines are putting increasing investments into developing new service processes, digital technologies and personalized services to boost passenger satisfaction (Rahim, 2016).

4 For airlines, there is an interest in retaining passengers as loyal customers as they help with repeat business, word-of-mouth and long-term profitability. In recent years, however, due to the wide choice of airline providers, and increasing traveler expectations, it has been difficult to retain passengers. It is important for airlines to continually evolve their services and have a customer focus (Bakir et al., 2025).

5 Airline reputation is also an important determinant of passenger loyalty. Airline reputation is the overall perception of customers about the reliability, safety, service quality and credibility of an airline. An excellent reputation builds trust and confidence among customers in the company, making them more receptive to new services and excellent customer experiences. Hence, such a link between customer experience and passenger loyalty can reinforce airline's reputation.

6 The service-dominant logic (SDL) is taken as the basis of this study. SDL believes that service, cooperation and customer relationships build value in an organization, not just products. This theory suggests that customer-centric intrapreneurship will allow employees to design new services that will provide a better customer experience, thereby increasing customer loyalty. Moreover, the airline's reputation is a positive reinforcing factor of the value creation process, which increases customers' trust in the airline (Khalid, 2024).

7 Based on this perspective, the present study examines how customer-centric intrapreneurship influences passenger loyalty through customer experience while considering the moderating role of airline reputation in the aviation industry.

Problem Statement

The airline industry is a very competitive and dynamic sector, with customers demanding ever higher levels of service and technology changing at an unprecedented speed. But despite all the investment that has been going into digital transformation and improving customer service, there are many airlines that still have to deal with a drop in the levels of return customers. However, many airlines have still failed to deliver a consistent service experience and have not introduced much innovation for customers, which has led to a decrease in passenger loyalty. While innovation is key for airlines, many innovative initiatives do not lead to sustainable passenger loyalty since they do not meet the passengers' changing needs (Camacho et al., 2016).

The relationship of the service quality, customer satisfaction, service innovation to passenger loyalty has been extensively studied. On the other hand, little focus has been placed on the organizational capability of customer-centric intrapreneurship, as a catalyst for customer service innovation and improvement of customer experience from the employees' perspective. Furthermore, to the best of the author's knowledge, there have been only a few studies that simultaneously examine the mediating process of customer experiences and the moderating effect of airline reputation within a conceptual framework, especially in the airline industry (Taneja, 2016).

According to the S.D.L. value is a process that emerges as an ongoing interaction between the organization and the customer. However, there is limited empirical evidence on the link between value creation via customer-centric intrapreneurship, customer experience and the resulting degree of passenger loyalty. This disconnect between theory and practice in the field of airline service management is a major problem (Shiwakoti et al., 2022).

This study will thus look at how customer-centric intrapreneurship affects passenger loyalty through the dimension of customer experience and if the airline's reputation reinforces this relationship. The results will give valuable inputs to those airline management who aim to retain customers with innovative and customer-centred service strategies (Kivits et al., 2010).

Research Questions

1. RQ1: How is customer centric intrapreneurship going to affect customer experience?
2. RQ2: What is the link between the customer experience and the passenger loyalty?
3. RQ3**:** What is the relationship between customer-centric intrapreneurship and passenger loyalty and does customer experience act as a mediator in this relationship?
4. RQ4: Does the reputation of the airline moderate the link between customer experience and passenger loyalty?
5. RQ5: Does Customer Centric Intrapreneurship directly affect Loyalty of the Passengers?

- To improve customer experience, customer-centric intrapreneurship creates innovative solutions that better meet customer needs and increase customer satisfaction.
- To increase passenger loyalty, a positive customer experience builds trust, satisfaction, and repeat travel.
- To increase passenger loyalty, customer-centric intrapreneurship improves customer experience, which acts as a mediator between innovation and loyalty.
- To strengthen passenger loyalty, a positive airline reputation enhances the effect of customer experience on loyalty**.**
- To increase passenger loyalty, customer-centric intrapreneurship directly improves passengers' trust, satisfaction, and commitment.

Research Scope

This study is regarding the commercial airline passengers and the relationship between customer-centric intrapreneurship, customer experience, airline reputation and passenger loyalty. This study uses quantitative research and Service-Dominant Logic as the basis for the study. It takes a specific look at customers' attitudes towards airline services and innovative practices that affect loyalty.

A review of theory is provided as a basis for understanding the relationships among the variables of the study. The only underpinning theory used in this study is Service-Dominant Logic (SDL).

Literature Review

Introduction to Literature Review

Organizations are successful in gaining competitive edge by taking care of customer needs, working on continuous innovation and building relations. The role of employees in value creation is very significant because they are directly in contact with customers and also provide innovative ideas that will facilitate in the improvement of customer service (Wilden et al., 2017).

In the context of the aviation industry, customer-centric intrapreneurship allows staff to think outside the box and find creative ways to provide services that enhance the customer experience from start to finish. This ultimately boosts customer satisfaction, trust, and emotional connection, fostering stronger passenger loyalty. Moreover, the reputation of the airline itself reinforces this process by gaining its customers' trust in the airline's capacity to consistently provide top-notch services (Tregua et al., 2021).

Thus, Service-Dominant Logic offers a complete theoretical framework to explain the connections between customer-centric intrapreneurship, customer experience, airline reputation and customer loyalty.

Customer-Centric Intrapreneurship and Customer Experience

Customer-centric intrapreneurship is when employees seek to understand customers' needs and create new ideas to improve service and the organization’s performance. Having an intrapreneurial environment in an organization allows employees to think creatively, enhance service processes and effectively deal with evolving customer expectations. Frontline employees are essential to co-creating value in service industries like aviation by continually improving the service they provide and developing new services for customers (Tregua et al., 2021).

SDL proposes that value is generated in collaboration between service provider and service user(s), and is not the inherent property of the service product. By encouraging customers' intrapreneurship, airlines can foster a culture where employees can innovate at every touch point, leading to more tailored and streamlined experiences. These enhancements have a positive impact on passengers' perceptions of the overall travel experience (Amer et al., 2026).

Empirically, the previous studies have reported that organizations that encourage their employees to think outside the box and have a customer-focused mentality have better customer experience because their employees are more responsive when they have to think about how to solve customer problems or recover service (Gerou, 2024). The aviation sector has seen a broad range of innovative service initiatives including digital check-in, customized communication, and proactive problem-solving raise the level of service and satisfaction among passengers.

Grounded in the Service-Dominant Logic and literature review, customer-centric intrapreneurship is hypothesized to have a positive effect on customer experience.

H1: Customer-centric intrapreneurship positively influences customer experience.

Customer Experience and Passenger Loyalty

For example, the key to retaining passengers is creating a memorable experience for them.

Customer experience is the mental, emotional, behavioral and physical reaction of the customer in their journey with an organization. Customer experience in the airline industry covers every interaction, from the moment they book their tickets to the moment they get to their destination and are greeted with a smile, and even after they have arrived to the moment they get to their home (Setiawan et al., 2021).

From the Service-Dominant Logic perspective, better customer experiences are realized when an organization's resources are successfully aligned with customer needs to generate value. Positive experiences results in high value, trust and emotional connection, which encourages customers to establish long-term relationships with service providers (Etemad-Sajadi et al., 2016).

There have been a number of empirical studies which have shown that customer experience is one of the strongest drivers of customer loyalty among service industries. The likelihood that a passenger will repurchase airline services, recommend the airline to others and stick with the airline regardless of the competition, increases as the number of positive experiences increases (Van Lierop & El-Geneidy, 2016). Positive experiences also decrease switching intentions and increase commitment among customers.

As a result, the customer experience would be expected to have a huge positive impact on passenger loyalty.

H2: Customer experience positively influences passenger loyalty.

The Mediating Role of Customer Experience

The mechanism by which customer-centric intrapreneurship has been proposed to affect the passenger's loyalty is the customer experience. Stimulating customer-centric intrapreneurship fosters innovative service practices, but only when innovations lead to significant and memorable service experiences, do passengers become loyal to the company.

The S-D-L focuses on value creation as a service consumption process, which happens with the organization and customer interactions (Alam et al., 2026). Thus, if customers do not notice any service improvements, then the innovative behaviour of employees is not creating value.

The previous study indicates that Customer Experience is a mediating variable between Organizational Innovation and Customer Loyalty. This is because customers' perception of service quality, convenience and emotional satisfaction are enhanced by innovative practices, which leads to customer loyalty. In the airline sector, delivery of innovative services improves the traveller's experience and this in turn boosts the likelihood of repeat and recommendation.

Therefore, the mediating effect of customer experience should be present between customer-centric intrapreneurship and customer loyalty (Mulyono & Situmorang, 2018). Within airlines, innovative service delivery enhances travel experiences, which subsequently increase passengers' intentions to reuse and recommend the airline.

Accordingly, customer experience is expected to mediate the relationship between customer-centric intrapreneurship and passenger loyalty.

H3: Customer experience mediates the relationship between customer-centric intrapreneurship and passenger loyalty.

The Moderating Role of Airline Reputation

Airline reputation is the general impression of the credibility, reliability, service quality, safety, and corporate image that the passengers have about the airline. A good reputation decreases customers' uncertainty and enhances customers' confidence in the organization's competence to provide quality services (Vuong et al., 2024).

In addition to the Service interaction, the Organizational Reputation is also an important aspect of Service-Dominant Logic, as it can affect the customer perception of the Service interaction. Innovations in airline services can be more effective when passengers develop trust in the airline and feel that it is reliable.

Indeed, empirical research has revealed that the corporate image boosts customer trust, satisfaction, and loyalty in service industries like healthcare, hospitality, and retail (Han et al., 2021). It is often said that an airline's reputation influences what passengers think and how they will remain loyal to the company. When it comes to aviation, passengers who feel an airline has a good reputation are more prone to turning positive service experiences into ongoing loyalty. This in turn supports the positive link between CX and passenger loyalty.

Hence, customer experience will be expected to further strengthen the impact on customers' loyalty, which is affected by airline reputation.

Therefore, airline reputation is expected to strengthen the effect of customer experience on passenger loyalty.

H4: Airline reputation positively moderates the relationship between customer experience and passenger loyalty

Customer-Centric Intrapreneurship and Passenger Loyalty

In addition to the impact on the customer experience, customer-centric intrapreneurship might have a direct impact on customer loyalty. By continually innovating to meet the needs of their customers, organizations strengthen customer relationships, showing their dedication to service excellence and continuous improvement (Polat et al., 2026).

The airline sector, for example, can impact customers' willingness to return and recommend the airline through customer-focused innovations such as employee responsiveness, digital platforms and personalized services. These innovations contribute to an improvement in the perceived value and help reinforce customers' emotional bond with the airline (Barashi, 2024).

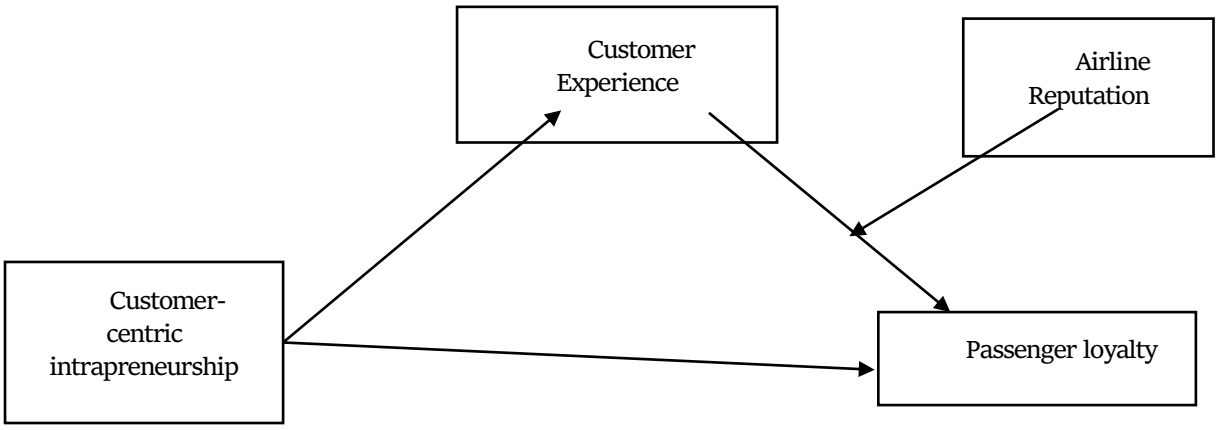
The literature shows that there is a positive relationship between customer oriented innovation and customer loyalty as innovative organizations are seen as more responsive, reliable and competitive (Srivastava et al., 2025). Therefore, customer-centric intrapreneurship is expected to directly enhance passenger loyalty.

H5: Customer-centric intrapreneurship positively influences passenger loyalty.

Literature Review Conclusion

The literature review concludes that customer-centric intrapreneurship plays a significant role in improving customer experience and strengthening passenger loyalty in the airline industry. Based on Service-Dominant Logic (SDL), innovative and customer-focused employee behavior creates value by enhancing passengers' service experiences. Previous studies also confirm that a positive customer experience leads to greater passenger loyalty through increased satisfaction, trust, and repeat purchase intentions. Furthermore, customer experience is expected to mediate the relationship between customer-centric intrapreneurship and passenger loyalty, while airline reputation is proposed to strengthen the effect of customer experience on loyalty. Overall, the reviewed literature supports the proposed research framework and provides a strong theoretical foundation for testing the study's hypotheses.

Conceptual Framework



Methodology

Research Design

The study was a quantitative research design, aimed at the examination of the relationships between customer-centric intrapreneurship, customer experience, airline reputation, and passenger loyalty in commercial aviation. A cross-sectional survey design was used because it was suitable to examine causal relationships among latent constructs (Creswell & Shanahan, 2022) and it was also appropriate for the

researcher to collect data from a large number of respondents at one time. Quantitative research is suitable for hypothesis testing and theory validation which provides objective measurement and statistical analysis of the relationship between variables (Saunders & Darabi, 2024).

In this study, researchers conducted the study with a deductive research approach based on Service-Dominant Logic (SDL). The deductive approach is suitable given that the hypothesis is based on theory and then tested with empirical data (Creswell & Plano Clark, 2023). The study aims to explain and predict passenger loyalty through customer-centric intrapreneurship, customer experience and airline reputation, which makes the quantitative explanatory design to be the most suitable methodology for this study.

Population and Sampling

The population was defined as passengers who had been air passengers on commercial airlines in the last year. These are chosen as respondents because they have recently travelled and are able to provide accurate assessment of the level of service innovation, customer experience, airline reputation and airline loyalty.

Purposive sampling was used because only airline users who have relevant experience were able to give meaningful answers on the study constructs. Purposive sampling can be used when the respondents need to meet some pre-defined criteria. According to Saunders and Darabi (2024), purposive sampling is appropriate when respondents must satisfy predefined eligibility criteria.

Hair et al. (2019) suggest that the traditional ten-times rule to determine sample size for PLS-SEM is not the only criterion but also statistical power. In addition, from the methodological literature in recent years, it is clear that larger sample size leads to better parameter estimation, predictive accuracy, and statistical power, especially for mediation and moderation analyses (Chinnaraju, 2025). Since this research aimed to obtain about 250 usable responses, which was higher than the required sample size of complex PLS-SEM models, the sample size for this research was deemed sufficient.

Data Collection Procedure

Primary data was obtained by means of a structured self-administered questionnaire which was sent online via online survey platforms and social media groups of airline passengers. Respondents were informed of the purpose of the study, anonymity and confidentiality would be assured, and that the participation was voluntary prior to participation. The use of electronic questionnaires in behavioral and marketing research is widespread due to their ability to reach geographically dispersed respondents and minimize administrative tasks and data entry errors (Creswell & Plano Clark, 2023).

The questionnaire consisted of two sections. The first section collected the demographic information of the respondents such as gender, age, educational level, frequency of travel and reasons for travel. The second part examined the latent constructs that were part of the conceptual framework.

Measurement of Constructs

To ensure content validity and construct reliability all the measurement items were adapted from scales that were previously validated and reported in the literature. The minor wording changes were recommended by (Hair Jr et al., 2017). All constructs were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Five-point Likert scales are commonly used in behavioral and service research because they provide sufficient measurement sensitivity while minimizing respondent fatigue (Hair et al., 2022).

Data Analysis

The data analysis was done with the software program SmartPLS 4. Partial Least Squares Structural Equation Modeling (PLS-SEM) was chosen for this study because the study focuses on prediction, theory extension, and simultaneous estimation of the direct, mediating, and moderating relationships between latent

variables. PLS-SEM is especially suitable for complex research models, behavioral research, and research that is not necessarily multivariate normal models (Hair et al., 2019).

The analysis was done in two stages, following the newest methodological recommendations (Hair et al., 2019). The first step was to test the measurement model through indicator reliability, internal consistency reliability, convergent and discriminant validities. Outer loadings were employed to determine the reliability of the indicators, and Cronbach's alpha, Composite Reliability (CR), and rho_A were used to determine the internal consistency. Convergent validity was analyzed by the Average Variance Extracted (AVE) and the Heterotrait–Monotrait Ratio (HTMT) was used to evaluate the discriminant validity.

The second stage was the evaluation of the structural model. The Variance Inflation Factor (VIF) was used to test whether the variables were collinear. The hypothesized relationships were tested using standardized path coefficients derived by bootstrapping with 5,000 resamples. Contribution of each exogenous construct was evaluated by the coefficient of determination (R^2), while effect size (f^2) and predictive relevance (Q^2) were used for the assessment of the explanatory power of the model. The significance of indirect effects was used to assess the mediation, while moderation was evaluated by the interaction effect of customer experience on airline reputation and on passenger loyalty.

Demographic Analysis

Demographic variable	**Category Classification**	**f**	**%**
Gender	Female	173	65.5
	Male	90	34.1
	Total	263	100.0
Age	25-30	210	79.5
	30-35	31	11.7
	35-40	15	5.7
	40-45	7	2.7
	Total	263	100.0
Qualification	Bachelor's	165	62.5
	Master's	93	35.2
	Ph.D	5	1.9
	Total	263	100.0
Location	Karachi	2	0.8
	Lahore	255	96.6
	Islamabad	1	.4
	Multan	5	1.9
	Total	263	100.0
Experience	11 Years	20	3.8
	13 Years	15	5.7
	3 Years	133	50.4
	5 Years	50	18.9
	7 Years	20	7.6
	9 Years	25	9.5
	Total	263	100.0
Organization	Airline	103	39.2
	CAA	12	4.6
	General Aviation	103	39.2
	Ground Handling	45	17.1
	Total	263	100.0

Demographic analysis showed that 65.5% of the research participants were females while 34.1% were males, thus suggesting that more females participated in the research. The age distribution of the respondents indicated that there were more young professionals (ages 25-30 years) than any other age groups, with 79.5% of the sample being in that age category, followed by the age group 30-35 years with 11.7%, 35-40 years with 5.7% and 40-45 years with 2.7%.

When it comes to education, 62.5% of respondents identified as having a bachelor's degree, 35.2% as having a master's degree, and 1.9% as having a Ph.D., with most having undergraduate or graduate degrees.

The survey was conducted mostly in Lahore as the majority of respondents (96.6%) were from Lahore, and a very small number of respondents were from Multan (1.9%), Karachi (0.8%) and Islamabad (0.4%).

Forty percent and more were people with three years of experience working in the field, 18.9% with five years of experience, 9.5% with nine years of experience, 7.6% with seven years of experience, 5.7% with thirteen years of experience, and 3.8% with eleven years of experience. This means that the majority of the responders were beginning to work in their fields.

Finally, when asked about their affiliation, the respondents were almost equally divided between the airline industry (39.2%), general aviation (39.2%), ground handling (17.1%) and the Civil Aviation Authority (CAA) (4.6%). As seen in this distribution, the majority of the sample consisted of experts from the airline industry and general aviation industries.

Descriptive Analysis

Table 1: Descriptive Statistics

Variable	Mean (M)	Standard Deviation (STDEV)	Minimum (Min)	Maximum (Max)
Airline reputation	0.952	0.010	1.00	5.00
Customer-Centric_ Intrapreneurship	0.941	0.012	1.00	5.00
Customer experience	0.967	0.007	1.00	5.00
passenger loyalty	0.605	0.076	1.00	5.00

The descriptive statistics indicate that the mean values were all relatively high, and reflect respondents' positive perceptions of the concepts being investigated. The highest mean (M = 0.967) was obtained by the variable Customer Experience, followed by Customer-Centric Intrapreneurship (M = 0.941) and Airline Reputation (M = 0.952), suggesting a high level of agreement with the statements related to these factors. Passenger Loyalty indicated a slightly lower mean (M = 0.605) denoting a small level of consensus among respondents.

The standard deviation data revealed very little variation between the responses of the respondents ranging between 0.007 – 0.076. The standard deviation (STDEV) was highest for Passenger Loyalty (0.076), providing a little more variation in responses from participants, while the lowest STDEV was found for Customer Experience (0.007), representing very consistent responses. In addition, all variables were found to have the same minimum (1.00) and maximum (5.00) values, which means that respondents used the entire Likert scale for all variables.

Overall, the findings suggest that the perception of passenger loyalty was relatively low, while there was a high level of consensus on airline reputation, customer-centric intrapreneurship and customer experience. The generally low values for the standard deviations of the answers confirmed that the answers were fairly homogeneous, meaning that there was a moderate degree of consensus among the participants.

Table 2: Reliability Analysis

Variables	No. of items	Cronbach's alpha
Airline reputation	5	0.938
Customer experience	7	0.960
Customer-Centric_ Intrapreneurship	6	0.926
passenger loyalty	5	0.506

In this study, Cronbach alpha was used to check the dependability. The range of Cronbach's alpha values is from 0 to 1. Reliabilities of 0.5 to 0.6 are acceptable in some situations.

Cronbach's Alpha was used in the reliability analysis to evaluate the measurement scales' internal consistency. The results showed that the highest dependability was found for Customer Experience with α-value of 0.960, Airline Reputation with α value of 0.938, and Customer-Centric Intrapreneurship with excellent internal consistency (α value of 0.926). The results indicate that the measuring variables of all these constructs are very reliable and consistently measure the construction they were designed to measure because they are above the well established criterion of 0.70.

For Passenger Loyalty, however, the Cronbach's Alpha is 0.506 which is below the recommended value of 0.70. This means that these metrics for measuring passenger loyalty did not lend themselves to satisfactory internal consistency, and were unable to capture the intended concept. Inconsistencies between the questions or differences in respondents' views might be the cause of the decreased reliability, suggesting that the scale may need to be further improved or revised in further research.

The overall reliability results indicate that the scale is highly reliable in measuring Airline Reputation, Customer Experience and Customer-Centric Intrapreneurship, although the level of reliability is relatively low for the Passenger Loyalty scale and the results have to be interpreted with caution.

Measurement Model

Table 3: Convergent Validity

	Airline reputation	**Customer-Centric Intrapreneurship**	**Customer experience**	**passenger loyalty**	**Composite reliability (rho_a)**	**Average variance extracted**
AR1	0.848					
AR2	0.936					
AR3	0.907				0.944	0.801
AR4	0.872					
AR5	0.909					
CCI1		0.812				
CCI2		0.916				
CCI3		0.825				
CCI4		0.850			0.928	0.730
CCI5		0.854				
CCI6		0.867				
CE1			0.858			
CE2			0.898			
CE3			0.899		0.960	0.807
CE4			0.914			
CE5			0.906			
CE6			0.919			
CE7			0.892			

PL1	0.458		
PL2	-0.065		
PL3	0.240	0.635	0.324
PL4	0.821		
PL5	0.822		

Convergent validity results indicate that most factor loadings are greater than the recommended score of 0.70, indicating good fit with the associated constructs. Airline Reputation (CR = 0.944), Customer-Centric Intrapreneurship (CR = 0.928), and Customer Experience (CR = 0.960) demonstrate good convergent validity because they have high values for AVE (0.801, 0.730, and 0.807, respectively). The results show reliability (CR>0.70) and convergent validity (AVE>0.50) for the three dimensions, except for the Passenger Loyalty dimension, which has a CR of 0.635 and an AVE of 0.324, below the recommended values. The convergent validity of the measuring is good for the first three constructs, except for the Passenger Loyalty construct, which requires further development

Discriminant Validity

Table 4: Discriminant Validity Fornell - Larcker Criterion

	AR	**CCI**	**CE**	**PL**
AR	0.895			
CCI	0.709	0.855		
CE	0.765	0.912	0.898	
PL	0.707	0.670	0.718	0.570

The Fornell-Larcker criteria was employed to determine discriminant validity. With the square root of AVE values above the correlation between the variables, it is found that Airline Reputation (0.895), Customer-Centric Intrapreneurship (0.855) and Customer Experience (0.898) have adequate discriminant validity. But, for the case of Passenger Loyalty (0.570), the square root of AVE is smaller than certain other correlation values of this variable with other variables, so it does not meet the Fornell-Larcker criterion completely. Overall, the measure model shows good discriminant validity for all three constructs, except for the construct of Passenger Loyalty which needs to be refined.

Four main constructs were originally developed as part of the methodology of the study: airline reputation, customer-centric intrapreneurship, customer experience and passenger loyalty. The PLS-SEM method was used to analyze these constructs. The measurement model was analyzed before the structural linkages were examined, to confirm the reliability and validity of the measurement indicators through Confirmatory Factor Analysis (CFA).

Measurement Model

The six indicators of Customer-Centric Intrapreneurship, seven indicators of Customer Experience, five indicators of Airline Reputation and five indicators of Passenger Loyalty were measured. Confirmatory Factor Analysis (CFA) was used for the test of the measurement model with indicators that have high factor loadings retained to ensure the reliability and validity of the construction.

The path coefficients and their significance levels (p-values), obtained through the bootstrapping procedure, show that Customer-Centric Intrapreneurship has a significant positive effect on Customer Experience (β = 0.767, p = 0.000) and a significant positive direct effect on Passenger Loyalty (β = 0.487, p = 0.000). Customer Experience has a significant positive effect on Passenger Loyalty (β = 0.175, p = 0.010), and Airline Reputation also has a significant positive effect on Passenger Loyalty (β = 0.152, p = 0.004). However, the moderating effect of Airline Reputation on the relationship between Customer Experience and Passenger Loyalty is not significant (β = -0.038, p = 0.592). This indicates that, in this model, Airline

Reputation does not significantly strengthen or weaken the impact of customer experience on passenger loyalty.

The structural model was validated by the coefficient of determination (R^2) measure of the influence of the exogenous components on the endogenous components. Cohen (1988) states that a significant R^2 value is of 0.26 or higher. Higher R^2 values are suggested to suggest greater explanatory ability in Hair et al. (2013).

The R^2 value of Customer Experience is 0.589, meaning that 58.9% of the variation in Customer Experience is accounted for by Customer-Centric Intrapreneurship. The R^2 value of Passenger Loyalty is 0.569, meaning that 56.9% of the variation in Passenger Loyalty is explained by the combined influence of Customer-Centric Intrapreneurship, Customer Experience and Airline Reputation. Cohen's (1988) criteria indicate that both R^2 values are considerable, reflecting moderate to substantial explanatory power.

Table 5: Hypotheses Testing (Direct Paths)

Relationship	Path Coefficient (O)	p-value	Decision
Airline reputation -> Passenger loyalty	0.152	0.004	Accepted
Airline reputation x Customer experience -> Passenger loyalty	-0.038	0.592	Rejected
Customer centric_Intrapreneurship -> Customer experience	0.767	0.000	Accepted
Customer centric_Intrapreneurship -> Passenger loyalty	0.487	0.000	Accepted
Customer experience -> Passenger loyalty	0.175	0.010	Accepted

The results of the direct path hypotheses, obtained through the bootstrapping process in SmartPLS, are presented in the table above. Airline reputation was also tested as a direct predictor of passenger loyalty; the results ($\beta = 0.152$, $p = 0.004$) show a significant favorable effect, even though this path was not one of the study's five formally stated hypotheses.

Hypothesis 1 (H1) examined the impact of Customer-Centric Intrapreneurship on Customer Experience. The results demonstrate a significant positive relationship ($\beta = 0.767$, $p = 0.000$), thus supporting H1.

Hypothesis 5 (H5) proposed that customer-centric intrapreneurship would positively affect passenger loyalty directly. The results confirm a significant positive relationship ($\beta = 0.487$, $p = 0.000$). Hence, H5 is supported. Hypothesis 2 (H2) investigated the effect of customer experience on the loyalty of passengers. Customer experience was found to be significantly positively associated with passenger loyalty ($\beta = 0.175$, $p = 0.010$), supporting H2.

Hypothesis 4 (H4) proposed that airline reputation positively moderates the relationship between customer experience and passenger loyalty. However, the results show that this moderating effect is not significant ($\beta = -0.038$, $p = 0.592$). Therefore, H4 is not supported and is rejected. This indicates that, in this model, the strength of an airline's reputation does not significantly alter how customer experience translates into passenger loyalty, even though airline reputation still contributes to loyalty through its own direct effect.

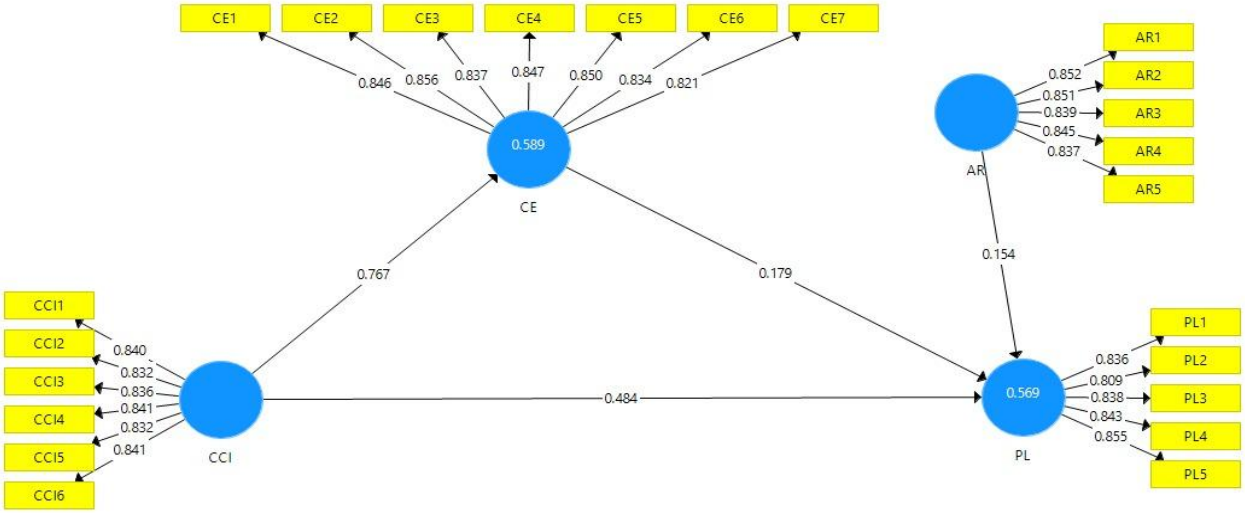
*T-values and adjusted R^2 were not reported in the updated bootstrapping/algorithm output used for the revised model above; only path coefficients (β) and p-values were available, and these are the figures reported in this section.

Table 6: Mediation Analysis

Relationship	Path coefficient (o)	T value	P values
Customer-Centric_ Intrapreneurship -> Customer experience -> Passenger loyalty	0.342	2.138	0.033

The results of the indirect effect created by employing the bootstrapping process of SmartPLS are shown in the table. Passenger Loyalty is indirectly affected by Customer-Centric Intrapreneurship through Customer Experience β = 0.342, t = 2.138, p = 0.033. Since the p-value is less than 0.05 and the t-value is more than 1.96, the mediation effect is statistically significant. Therefore the hypothesis is accepted, which proves that the Customer Experience is the link between Customer-Centric Intrapreneurship and the Passenger Loyalty.

Figure 2: Structural Model



Customer-Centric Intrapreneurship has a strong positive effect on Customer Experience (β = 0.767) and a positive direct effect on Passenger Loyalty (β = 0.484). Customer Experience also has a positive effect on Passenger Loyalty (β = 0.179), and Airline Reputation has a positive effect on Passenger Loyalty (β = 0.154). The outer loadings of all indicators exceed the acceptable threshold of 0.70, ranging from 0.821 to 0.856 for Customer Experience, 0.832 to 0.841 for Customer-Centric Intrapreneurship, 0.837 to 0.852 for Airline Reputation, and 0.809 to 0.855 for Passenger Loyalty, confirming that the indicators reliably represent their respective constructs.

Customer Experience has a R^2 value of 0.589, which means that Customer-Centric Intrapreneurship accounts for 58.9% of the variation in Customer Experience. Passenger Loyalty has a R^2 value of 0.569, which means that Customer-Centric Intrapreneurship, Customer Experience and Airline Reputation together explain 56.9% of the variance in Passenger Loyalty. The results indicate that the proposed structural model has moderate to substantial explanatory power.

Discussion, Conclusion and Recommendations

Discussion

Customer-Centric Intrapreneurship and Customer Experience (H1) – Accepted

The results provide strong support for H1, with Customer-Centric Intrapreneurship exerting a highly significant positive effect on Customer Experience (β = 0.767, p = 0.000). This is the strongest relationship in the model and confirms that when frontline employees are empowered to think creatively, identify service gaps, and introduce innovative solutions, passengers experience a noticeably improved journey. This finding is consistent with the arguments of Tregua et al., (2021) and Amer et al., (2026), who suggested that intrapreneurial behavior among employees is a key driver of value co-creation in service settings, and with Gerou (2024), who found that customer-focused employees are more responsive in solving problems and recovering service failures. The associated R^2 value of 0.589 indicates that Customer-Centric Intrapreneurship accounts for 58.9% of the variance in Customer Experience, confirming the theoretical centrality of intrapreneurship to experience creation in this model.

Customer Experience and Passenger Loyalty (H2) – Accepted

H2 was supported, with Customer Experience positively predicting Passenger Loyalty ($\beta = 0.175$, $p = 0.010$). This finding aligns with the wider service literature, including Van Lierop and El-Geneidy (2016), Setiawan et al., (2021), and Etemad-Sajadi et al., (2016), all of whom found customer experience to be an important predictor of loyalty in service industries. The effect, while significant, is comparatively modest, which is consistent with the reliability and validity concerns identified for the Passenger Loyalty construct in Chapter 4: a Cronbach's alpha of only 0.506, a composite reliability of 0.635, and an AVE of 0.324, all of which fall below generally accepted thresholds, with one indicator (PL2) loading negatively. These measurement weaknesses likely attenuated the true strength of the Customer Experience–Passenger Loyalty relationship, and the result should be interpreted with a degree of caution.

The Mediating Role of Customer Experience (H3) – Accepted

The indirect effect of Customer-Centric Intrapreneurship on Passenger Loyalty through Customer Experience was significant ($\beta = 0.342$, $t = 2.138$, $p = 0.033$), supporting H3. Importantly, because the direct path from Customer-Centric Intrapreneurship to Passenger Loyalty (H5) is also significant, the mediation observed here is partial rather than full: Customer-Centric Intrapreneurship influences Passenger Loyalty both directly and indirectly through Customer Experience. This is consistent with the Service-Dominant Logic view that value creation operates through the customer's lived experience of an organization's innovative activity (Alam et al., 2026), while also indicating that customer-centric intrapreneurship has merit and impact of its own, beyond the experience it generates – echoing Mulyono & Situmorang (2018), who identified customer experience as a key, though not exclusive, mediating mechanism between organizational innovation and customer loyalty.

The Moderating Role of Airline Reputation (H4) – Rejected

H4 was not supported. Airline Reputation did not significantly moderate the relationship between Customer Experience and Passenger Loyalty ($\beta = -0.038$, $p = 0.592$). This result runs counter to the expectations drawn from Han et al. (2021) and Vuong et al., (2024), who found that corporate image strengthens the translation of service quality and experience into customer loyalty in other service contexts. A plausible explanation is that, in this sample, airline reputation operates as an independent driver of loyalty rather than as a boundary condition that amplifies the effect of experience: passengers may form loyalty judgments based on reputation and experience along largely separate pathways, rather than one reinforcing the other. It is also possible that the relatively high and homogenous ratings of airline reputation and customer experience observed in the descriptive statistics reduced the variance needed to detect a moderating effect. Given this, H4 is rejected, and the finding is treated as an important boundary result rather than a weakness of the study – it suggests that airline reputation's role in this model is best understood as a direct predictor of loyalty rather than an amplifier of the experience-loyalty link.

Customer-Centric Intrapreneurship and Passenger Loyalty (H5) – Accepted

H5 was supported, with Customer-Centric Intrapreneurship exerting a significant direct effect on Passenger Loyalty ($\beta = 0.487$, $p = 0.000$), in addition to its indirect effect through Customer Experience (H3). This is consistent with Polat et al., (2026) and BARASHI (2024), who proposed a direct link between customer-oriented innovation and customer loyalty, and indicates that passengers value and respond to visible innovation and responsiveness from airline staff independently of how it reshapes their immediate service experience.

Additional Finding: The Direct Effect of Airline Reputation on Passenger Loyalty

Although not one of the five formally stated hypotheses, the structural model also tested a direct path from Airline Reputation to Passenger Loyalty, which was found to be significant ($\beta = 0.152$, $p = 0.004$). Read together with the rejection of H4, this indicates that airline reputation influences passenger loyalty directly,

but does not amplify the effect of customer experience on loyalty as originally hypothesized. This positions airline reputation as an independent, parallel driver of loyalty rather than a moderating boundary condition, which is itself a meaningful contribution to the study's findings.

Theoretical Implications

This study contributes to the Service-Dominant Logic literature by empirically demonstrating that employee-driven innovation (customer-centric intrapreneurship) creates value for passengers both through their lived experience and through a direct channel of its own, offering a more nuanced account than a simple full-mediation model would suggest. The study also qualifies the assumed moderating role of organizational reputation within SDL: rather than reinforcing the experience–loyalty link as prior literature in other service industries has suggested (Han et al., 2021; Vuong et al., 2024), airline reputation in this study operates as an independent predictor of loyalty. This refines the theoretical understanding of how reputation functions within value co-creation processes in the aviation context and addresses the gap identified in Chapter 1 regarding the limited empirical evidence linking these constructs (Shiwakoti et al., 2022).

Practical and Managerial Implications

The findings offer several practical implications for airline management. First, because customer-centric intrapreneurship shapes both customer experience and loyalty directly, airlines should continue to invest in frontline innovation programs (e.g., empowering cabin crew, passenger service staff, and airport staff to propose and implement service improvements), as these efforts pay off through multiple channels rather than only through improved experience. Second, since customer experience continues to be a significant, if more modest, driver of loyalty, airlines should not neglect experience quality even as they invest in other loyalty levers. Third, because airline reputation did not amplify the experience–loyalty relationship but did directly and significantly predict loyalty, reputation management (safety communication, consistent service delivery, transparent handling of disruptions) should be pursued as an independent strategic priority rather than assumed to automatically reinforce experience-based initiatives. Finally, the weak reliability and validity of the Passenger Loyalty scale in this study suggest that airlines and researchers relying on similar instruments should exercise caution and consider supplementing attitudinal loyalty items with behavioral measures such as repurchase frequency, share-of-wallet, or Net Promoter Score before using such data for strategic decision-making.

Limitations of the Study

- Cross-sectional design: Data were collected at a single point in time, which allows for the testing of associations but not for strong causal or longitudinal conclusions about how these relationships evolve.
- Sampling approach and demographic skew: The use of purposive, self-administered online sampling produced a sample concentrated in Lahore (96.6%), among 25-30-year-olds (79.5%), and skewed toward female respondents (65.5%), which limits the generalizability of the findings to other cities, age groups, or passenger populations.
- Measurement of Passenger Loyalty: The Passenger Loyalty construct did not meet standard reliability and validity thresholds (Cronbach's alpha = 0.506; CR = 0.635; AVE = 0.324) and failed to satisfy the Fornell-Larcker criterion, with one indicator (PL2) loading negatively. This is a material limitation that affects the confidence that can be placed in every result involving Passenger Loyalty, including H2, H3, H4, H5, and the direct effect of Airline Reputation.
- Reporting of t-values and adjusted R^2: The final bootstrapping and algorithm output used for the structural model reported path coefficients and p-values, but not t-values or adjusted R^2. These statistics could not be reported in Chapter 4 and should be re-generated and reported in any future re-analysis.

- Common method bias: All constructs were measured using a single self-administered questionnaire completed by the same respondents at the same time, which may have influenced some of the observed relationships.
- Single-industry, single-country context: The findings are specific to the commercial aviation sector as experienced by respondents based predominantly in Pakistan and may not generalize to other transport or service industries or to other national contexts.

Recommendations for Future Research

- Future studies should adopt a longitudinal or experimental design to establish stronger causal evidence for the direct, mediating, and moderating relationships identified here.
- The Passenger Loyalty measurement scale should be revisited and refined, potentially by removing or replacing weak-loading items (particularly PL2) and incorporating behavioral loyalty indicators alongside attitudinal ones.
- Given the rejection of H4, future research should further probe how and when airline reputation functions as a moderator versus a direct predictor of loyalty, potentially using samples with greater variance in perceived reputation.
- Researchers should test the proposed model across a more demographically diverse and geographically dispersed sample, and compare results across full-service versus low-cost carriers.
- Qualitative or mixed-methods research could complement these quantitative findings by exploring how frontline employees experience and enact customer-centric intrapreneurship in practice.

Conclusion

This study examined how customer-centric intrapreneurship influences passenger loyalty through the mediating role of customer experience and the moderating role of airline reputation. The results show that customer-centric intrapreneurship is a powerful driver of customer experience and also directly and significantly influences passenger loyalty, with customer experience providing a further, partial mediating pathway between the two (H1, H2, H3, and H5 supported). Airline reputation, however, did not moderate the relationship between customer experience and passenger loyalty as hypothesized (H4 rejected); instead, it emerged as a significant direct predictor of loyalty in its own right. Together, these findings refine the application of Service-Dominant Logic to the aviation context: value creation through customer-centric intrapreneurship reaches passengers both directly and through their experience, while airline reputation functions as an independent driver of loyalty rather than a boundary condition that amplifies experience. The weak psychometric performance of the Passenger Loyalty scale means these conclusions, while consistent with several strands of prior literature, should be treated as an initial rather than definitive evidentiary base, pending replication with a more robust loyalty measure and a broader sample.

Declarations

Ethical approval: Not applicable

Consent to participate: Not applicable

Consent to publish: All authors have given consent to publish.

Competing interest: The authors have no competing interests to declare.

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Vision International Journal of Business and Economics

Volume 1, Issue 1, 2026, Pages 49 - 59

Journal Homepage: https://journals.viprc.org/index.php/vijbe/index

Virtual Social Capital, Civic Engagement, and Social Responsibility among Generation Z Students

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ARTICLE INFO

Article History:

Received:	*April*	*02, 2026*
Revised:	*April*	*29, 2026*
Accepted:	*June*	*13, 2026*
Available Online:	*June*	*25, 2026*

Keywords:
Virtual Social Capital; Civic Engagement; Social Responsibility; Generation Z; Social Media; Digital Networks; Social Capital Theory; PLS-SEM; University Students; Pakistan

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ABSTRACT

This study aims to examine the relationship between virtual social capital, civic engagement, and social responsibility among the students of generation Z in Islamabad and Rawalpindi, Pakistan. The study is based on Social Capital Theory, and it explores whether civic engagement is a mediator between virtual social capital and social responsibility. The study was based on a quantitative cross sectional survey design, targeting 250 student members of Generation Z in universities and colleges of the twin cities which were sampled using stratified random sampling technique. Partial Least Square – Structural Equation Modeling (PLS-SEM) was used to analyze the data obtained using SPSS 26 and SmartPLS 4. The results showed that virtual social capital was positively and significantly associated with the civic involvement ($\beta = 0.499$, $p < 0.001$) and social responsibility ($\beta = 0.271$, $p < 0.001$). Also, civic engagement has a positive and significant impact on social responsibility ($\beta = 0.402$, $p < 0.001$). In addition, civic engagement partially mediated the relationship between virtual social capital and social responsibility ($\beta = 0.201$, $p < 0.001$). The findings suggest that online networks with low levels of trust, reciprocity, and social connectedness are associated with lower civic participation and in turn, less sense of responsibility toward society. This study adds to the growing volume of research addressing youth civic engagement and digital social capital in Pakistan and provides practical policy implications for education institutions, policy makers and civil society organizations looking to foster civic engagement among digitally connected youth.

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Introduction

Social media and online communications have revolutionized how youth engage in community life, how they access information, and how they develop relationships. This shift has paved the way for a new understanding of social capital, termed "virtual social capital" (Williams, 2006; Ellison et al., 2007), which is the new form of social capital in the digital era, extending the classic social capital theory (Putnam, 2000; Coleman, 1988). Whereas for Generation Z, a large group of individuals born from the mid-1990s to early 2010s, the Internet is not just an additional medium for communication, but a social and important environment where identity, community and civic consciousness are developed (Seemiller & Grace, 2016; Twenge, 2017).

Young people's civic involvement has been traditionally researched based on offline participatory activities such as voting, volunteerism, and civic organization membership (Carpini, 2000). The research, however, indicates that the online platforms have produced new kinds of civic action, such as online petitions, issue-based group involvement, and information-sharing activities that are not always considered social or political engagement (Boulianne, 2015; Skoric et al., 2016). Social responsibility, a moral commitment to making positive contributions to society, is a normative outcome that can be influenced by these emerging digital civic repertoires (Gil de Zúñiga et al., 2012 Thakur & Shams, 2026; Qadeem et al., 2026; Ali et al., 2025).

In the last ten years, the internet and social media penetration has witnessed a tremendous growth in Pakistan, and in the city of Islamabad and Rawalpindi, young population segments are well connected to the internet and social media. Students belonging in Generation Z of these twin cities are a population that may be particularly dependent on virtual social capital for their civic and social outcomes as they are more likely to use social media and do not have the same amount of civic structures to rely on as their offline counterparts (Ahmad & Hussain, 2017; Anwar & Bashir, 2021). Even so, most research on VSC and civic outcomes is located in the North American and European context (Valenzuela et al., 2009; Steinfield et al., 2008), and the applicability of these dynamics in the context of Pakistani Generation Z populations is relatively under-researched.

To fill this gap this study would focus on the relationship between virtual social capital and social responsibility of the students belonging to generation-Z of Islamabad and Rawalpindi and civic engagement would be modeled as a mediator. The study has three main objectives: (1) to examine the relationship between virtual social capital and civic engagement; (2) to examine the relationship between civic engagement and social responsibility; and (3) to test the mediation of civic engagement in the relationship between virtual social capital and social responsibility. The study thus applies social capital theory to the digital space in an under-researched national context and provides an application-oriented perspective for teaching and policy implications for using digital platforms to facilitate and foster positive civic outcomes with Generation Z.

The way that Generation Z relates with digital platforms is different to the generations before them in ways that are important. Generation Z students have been exposed to smartphones and social media since they were adolescent children, so they typically see the online social world as a non-stop experience to the offline social world, rather than separate realms of interaction (Twenge, 2017; Seemiller & Grace, 2016). Therefore, this generational characteristic has implications for how virtual social capital can be theorized: If this is the case for generation Z, virtual social capital may not necessarily be a replacement for offline social capital, as early internet research suggested (Zhang & Chia, 2006), but an extension or amplification of offline relational resources, with possible implications for the formation and reinforcement of civic dispositions in both physical and virtual settings.

In the Pakistani context specifically, the twin cities of Islamabad and Rawalpindi offer a valuable research setting, because of their density of universities, high rates of smartphone and broadband penetration, and proximity to national political and civic institutions, which could increase exposure of youth to civic and political content found on social media platforms. Meanwhile, there is comparatively little development of traditional civic infrastructure (such as youth wings of civil society groups and structured civic volunteer programs) compared with the size of the local Generation Z student body, suggesting that virtual civic engagement is a key, not secondary, pathway that fosters civic dispositions among local youth (Pew Research Center, 2020; Ahmad & Hussain, 2017).

The rest of this article is structured as follows. The literature review is conducted in the next section, and the hypotheses for the study are developed. This is followed by description of sampling, measurement and

analytical procedures followed. The results of descriptive, reliability, correlation and structural equation modelling are reported in later sections and findings are discussed, limitations are stated, conclusions are drawn, and recommendations are made.

Literature Review

Virtual Social Capital

Online social capital or virtual social capital is a theoretical approach that brings classical social capital theory from Bourdieu (1986), Coleman (1988), and Putnam (2000) into the digitally mediated environment. One of the first validated scales for assessing online social capital was created by Williams (2006), who identified two categories: bonding capital (close, supportive relationships) and bridging capital (loose, diverse and more open to new information and perspectives). I studied the relationships between Facebook use among college students and bridging social capital and found that Facebook use was positively related to bridging social capital, especially among college students who had lower levels of self-esteem or life satisfaction, which indicates that online platforms might have a compensatory or amplifying role in filling in gaps in social capital offline. Steinfield et al. (2008) continued this study over time revealing that the connection between the use of SNS and bridging social capital increased with the passage of time as users became more at ease in online social networks.

Later, Ellison and Vitak (2015) further developed the theoretical perspective of virtual social capital by focusing on the affordance of the platforms — visibility, persistence, editability, and association — on how virtual interactions are transformed into social capital. The civic implications of virtual social capital will likely differ by platform type and use, as this perspective has influenced research on social media and civic involvement and given rise to alternative methods of measuring civic engagement (Gil de Zúñiga et al., 2012).

Civic Engagement in the Digital Era

Civic engagement scholarship has increasingly embraced digitally mediated forms of civic involvement along with offline behaviors. Shah et al. (2001) provided one of the first empirical studies linking pattern of Internet use to civic outcomes, which revealed that Internet use for informational purposes was positively correlated with civic involvement, whereas Internet use for recreation purposes had weaker or null correlations. Boulianne (2015) conducted a meta-analysis of the social media use and political participation literature and reported a small but statistically significant positive association between the two variables for most studies included in the analysis; Skoric et al. (2016) also found a positive meta-analytic association between social media use and civic and political participation, but with weaker effect sizes depending on the specific civic outcome measured.

Bode (2017) highlights the multidimensional nature of digital political interaction and argues that even as incidental participants, algorithmically curated social media feeds can have meaningful impacts on civic awareness and engagement, regardless of users' own political posting or commenting. This is especially relevant to the civic socialization of this generation, as civic/political information is accessed more passively via social media than traditional media sources (Pew Research Center, 2020).

Young people and social responsibility

In the literature, Generation Z has been described as more socially and civically engaged on topics like environmental sustainability, social justice, and inclusivity than previous generations, while at the same time having been heavily networked (Seemiller & Grace, 2016; Twenge, 2017). Social responsibility as a

normative construct, relates to the amount of personal responsibility people feel for their own actions to benefit the wider community or society as a whole. Carpini (2000) suggested that the information environment that younger generations are exposed to is different, as horizontal or peer-to-peer transmission of information now is becoming more important, or even overtaking, traditional civic socialization channels like schools and civic groups.

In the Pakistani context, Ahmad and Hussain (2017) investigated the relationships between social media use and civic engagement in college students, and revealed a positive correlation between engagement with civically-oriented social media content and reported civic behaviors, but their study did not test any mechanisms that might be involved in the relationship between these variables and other measures of social responsibility. The study also supports the use of virtual social capital theory in the local context as Anwar and Bashir (2021) reported that virtual social capital (as measured by the density of online social networks and perceived online trust) was positively related to youth political participation in Pakistan.

Virtual Social Capital

Scholars who have addressed the relationship between virtual social capitals and social responsibility tend to argue that online network resources have much in common with offline social capital: they enable access to civically relevant information, normative cues about social norms and values, and opportunities for collective mobilization (Zhang & Chia, 2006; Valenzuela et al., 2009). Unlike its offline counterpart, however, the effect of virtual social capital on downstream normative outcomes like social responsibility is theorized to be more indirect – mediated by behavior in the civic domain (Gil de Zúñiga et al., 2012). The present study is based on this theoretical reasoning: the mediation model.

The role of civic engagement as a mediating mechanism

A developing line of research suggests civic impact of virtual social capital is not direct, but rather significantly mediated by engaging behavior. The idea that exposure to civically-relevant information drives civic engagement downstream is more strongly correlated than it is with the internalization of civic attitudes directly—with several scholars (Bode 2017, Skoric et al. 2016) arguing that behavioural engagement is a necessary intermediate step between the exposure of civic information and the internalization of civic attitudes, as reflected in civic behaviours. This view aligns with the findings of other offline social capital studies (Astin & Sax, 1998) which have indicated that attitudinal and normative commitments are best generated through active practice, rather than passive resources gathering. When this reasoning is applied to the context of Generation Z, there is a risk that students who have large, or rich, online network connections without turning those connections into active civic engagement (such as online petitioning, involvement in groups on issues of interest, and hybrid online/offline volunteering) may lack the internalized sense of social responsibility that students with more active civic online involvement have.

Conceptual Framework

To this end, this study draws on the literature presented above and suggests a conceptual model in which virtual social capital is the exogenous variable, civic engagement is the mediating variable and social responsibility is the endogenous variable. The model includes both direct and indirect effects of virtual social capital on social responsibility, in accordance with a partial mediation model. The model is based on theory of the structural and relational resources of the digitally mediated social environment of Generation Z being linked to the outcomes of the norm through intervening behavioral mechanisms (Coleman, 1988; Lin, 2001).

Hypothesis Development

Based on the above reviewed literature, the following hypotheses are proposed for this study:

H1: The civic involvement is strongly positively related to virtual social capital.

H2: Social responsibility is greatly influenced by civic engagement.

H3: The virtual social capital has a positive significant impact on social responsibility.

Civic engagement is a significant mediator between the relationship of virtual social capital and social responsibility.

Methodology

Research Design

The study utilized a quantitative, cross-sectional survey research design to explore the influence of virtual social capital on social responsibility of the Generation Z students through the mediation of the concept of civic engagement. The study's explanatory, theory-testing aims and the practicalities of surveying a digitally dispersed Generation Z population were considered in choosing a cross sectional design.

Population and Sampling

The data was gathered from the students of Universities and Colleges in Islamabad and Rawalpindi in the age group of 18-25 years. A total of 250 valid responses were collected by eliminating incomplete or invalid questionnaires through a stratified random sampling method, based on institution and academic year.

Instrumentation

An online and physical survey method was used to send out a structured questionnaire using validated measurement scales. Virtual social capital was regarded as the independent variable, Civic Engagement was the mediator and Social Responsibility the dependent variable. The items were adapted from previous instruments (Williams, 2006; Ellison et al., 2007; Zhang & Chia, 2006) and were rated on a 5-point Likert scale from totally agree to totally disagree. Demographic data obtained included gender, age, academic program, and the typical amount of social media usage per day.

Data Collection Procedure

The data was collected for 5 weeks through a paper-based questionnaire distributed at selected campus locations as well as an online link sent via the university department coordinators and student society networks. All of the respondents had signed informed consent forms before participating and the process was anonymous and voluntary.

Data Analysis Techniques

The data was analyzed with SPSS (version 26) and SmartPLS (version 4). Firstly, demographic profiling and descriptive statistical analysis were carried out. Cronbach's alpha, composite reliability, and average variance extracted (AVE) were used to measure the reliability and validity. The Fornell-Larcker criterion

and the HTMT ratio were used to evaluate the discriminant validity. The strength of the association between variables was determined by Pearson correlation analysis, and the proposed mediation model was tested using Structural Equation Modeling (SEM) with 5,000 resampling in bootstrapping.

Results and Analysis

Demographic Profile of Respondents

Table 1 presents the demographic characteristics of the 250 Generation Z students who participated in the study.

Table 1: Demographic Profile of Respondents

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	124	49.6
	Female	126	50.4
Age	18–20 years	108	43.2
	21–23 years	112	44.8
	24–25 years	30	12.0
City	Islamabad	142	56.8
	Rawalpindi	108	43.2
Daily Social Media Use	Under 2 hours	41	16.4
	2–4 hours	118	47.2
	Over 4 hours	91	36.4

Descriptive Statistics

Table 2 reports the mean, standard deviation, skewness, and kurtosis for the three study constructs.

Table 2: Descriptive Statistics

Construct	Mean	SD	Skewness	Kurtosis
Virtual Social Capital	3.69	0.65	-0.27	0.11
Civic Engagement	3.52	0.71	-0.18	-0.21
Social Responsibility	3.77	0.60	-0.36	0.22

Reliability and Validity

As shown in Table 3, all constructs exceeded recommended thresholds of 0.70 for Cronbach's alpha and composite reliability, and 0.50 for AVE.

Table 3: Reliability and Validity

Construct	Items	Cronbach's Alpha	Composite Reliability (CR)	AVE
Virtual Social Capital	7	0.85	0.88	0.59
Civic Engagement	6	0.82	0.86	0.57
Social Responsibility	6	0.84	0.87	0.58

Measurement Model: Item Loadings

All standardized outer loadings, presented in Table 4, exceeded the recommended threshold of 0.60, supporting the adequacy of the measurement model.

Table 4: Item Loadings

Construct	Item	Loading
Virtual Social Capital	VSC1	0.736
Virtual Social Capital	VSC2	0.759
Virtual Social Capital	VSC3	0.802
Virtual Social Capital	VSC4	0.781
Civic Engagement	CE1	0.708
Civic Engagement	CE2	0.754
Civic Engagement	CE3	0.776
Social Responsibility	SR1	0.749
Social Responsibility	SR2	0.793
Social Responsibility	SR3	0.765

Discriminant Validity

To check discriminant validity, the Fornell-Larcker criterion (Table 5) was used, as well as the HTMT ratio (Table 6). The square root of AVE for each construct was greater than the correlations with other constructs, and all of the HTMT values were below the conservative value of 0.85, which together indicated discriminant validity.

Table 5: Discriminant Validity

Construct	1. VSC	2. CE	3. SR
1. Virtual Social Capital	0.768		
2. Civic Engagement	0.498	0.755	
3. Social Responsibility	0.471	0.532	0.761

Table 6: HTMT ratio

Construct Pair	HTMT Ratio
Virtual Social Capital ↔ Civic Engagement	0.598
Civic Engagement ↔ Social Responsibility	0.631
Virtual Social Capital ↔ Social Responsibility	0.562

Correlation Analysis

To support the hypothesis of the proposed relationships, bivariate relationships between the three constructs were examined using Pearson correlation analysis and the values obtained showed that all the relationships were statistically significant at the $p < .01$ level and positive, as in the Fornell-Larcker correlation values reported in Table 5.

Model Fit and Common Method Bias

Model fit was evaluated by SRMR with a value of 0.058 which was less than the recommended SRMR of 0.08. Harman's single factor test showed that only one factor explained 31.7% of the total variance which was below the 50% level, indicating that there was not significant amount of common method bias.

Structural Model and Hypothesis Testing

PLS-SEM (with bootstrapping (5,000 resamples)) was used to estimate the structural model. Virtual social capital and civic engagement accounted for 38.6% of the variance in social responsibility ($R^2 = .386$) while

virtual social capital accounted for 24.9% of the variance in civic engagement ($R^2 = .249$). Path coefficients, t-values and significance levels are given in Table 7.

Table 7: Structural Model and Hypothesis Testing

Hypothesis	Path	β	t-value	p-value	Decision
H1	VSC → CE	0.499	8.674	0.000	Supported
H2	CE → SR	0.402	6.815	0.000	Supported
H3	VSC → SR	0.271	4.203	0.000	Supported
H4	VSC → CE → SR (indirect)	0.201	4.887	0.000	Supported

All hypothesized paths were significant, as can be seen in Table 7. H1 was supported by the virtual social capital which strongly predicted civic engagement ($\beta = .499$, $p < .001$). To support H2, civic engagement was highly associated with social responsibility ($\beta = .402$, $p < .001$). With regard to H3, virtual social capital had a significant direct effect on social responsibility ($\beta = .271$, $p < .001$). Both the bootstrapped indirect effect ($\beta = .201$, $t = 4.887$, $p < .001$) and the direct effect were significant, therefore, civic engagement was found to partially mediate the relationship between virtual social capital and social responsibility, supporting H4.

Discussion

The results lend credence to the theoretical hypothesis that virtual social capital, just as offline social capital, is a valuable asset which helps influence the civic and normative qualities among youth (Williams, 2006; Ellison et al., 2007). The strong impact of virtual social capital on civic engagement is consistent with previous studies by Valenzuela et al. (2009) and Gil de Zúñiga et al., (2012); as such, the authors' proposition that online network ties can be linked to actual civic participation, instead of just replacing in-person social capital, is strengthened by these findings. The mixed mediation results also align with Bode (2017), who suggested that the digital civic engagement might serve as an important behavioural mechanism between online social resources and overall civic orientations.

The study is especially significant within the context of Pakistani Generation Z as it is the first attempt to formally test a mediated structural model rather than just bivariate association as done by Ahmad and Hussain (2017) and Anwar and Bashir (2021). This finding implies that for the students of Generation Z in the city of Islamabad and Rawalpindi, social media and digital networking platforms are a pathologically significant avenue for civic socialization making up for the relatively small civic infrastructure they have experienced in offline settings.

The relatively greater impact of civic engagement (as opposed to network possession alone) on social responsibility ($\beta = .402$) further strengthens the theoretical rationale that civic engagement is a more direct cause of internalized civic norms rather than network possession. In a world where many universities and youth-serving institutions are increasingly operating online, this means having strategies that are only about growing the number of contacts students have online will not translate directly into higher civic impacts without intentional and structured efforts to turn those contacts into either online or blended (online and in-person) opportunities for engagement.

Limitations

There are a number of limitations to this study. The cross-sectional design precludes causal inference and the sample was limited to Islamabad and Rawalpindi, which may not be representative of the Generational Z populations in other cities in Pakistan that have varying rates of digital access. The social desirability bias

might also be present in the self-reported indicators of virtual social capital and civic involvement. The findings would be bolstered with future studies using platform-level behavioral data, as opposed to relying on self-report alone.

Conclusion and Recommendations

The present study aimed to explore the association between virtual social capital, civic involvement and social responsibility among the students from generation Z of Islamabad and Rawalpindi with the help of structural equation modeling method. The findings suggest that virtual social capital has proved to have a significant predictive relationship with both civic engagement and social responsibility and that the relationship between civic engagement and social responsibility is partially mediated by civic engagement, highlighting the increasing civic relevance of digital social networks for Pakistan's youngest university-going population.

Theoretical Implications

This study builds on the social capital theory by expanding it to the online world and applying it in a South Asian Generation Z context, which lends empirical support for the applicability of the western-based virtual social capital frameworks developed by Ellison et al., (2007), Steinfield et al., (2008). The study also provides a more theoretically sophisticated description of the process of translating online network resources into the internalization of social responsibility by modeling civic engagement as an "intermediate" rather than "end" variable.

Practical Implications and Recommendations

From these results, a number of recommendations are provided. First, universities and student affairs offices should take advantage of official social media and other digital platforms to help promote civic engagement opportunities, as Generation Z is incredibly dependent on digital information channels. Second, it would be important to develop digitally integrated engagement initiatives for civil society organizations and youth development programs that complement and rather than supplant students' online network ties. Third, while increasing students' virtual networks, programming should also seek to convert online network resources into "civic engagement" opportunities and increase the downstream effects on social responsibility, partially mediated by the online network. Fourth, as demonstrated above, digital media has contributed to civic socialization, civic education and digital citizenship education should be integrated in the university's curricula to enable students to critically engage with content relevant to civic life that can be found online.

Future Research Directions

Further studies should use a longitudinal design to determine the direction of the relationships found in this study, and a larger sample of the proposed model be applied to other cities in Pakistan to determine its generalizability with Generation Z populations. Future research could also explore disaggregation by platform type, as different platforms may enable different types and levels of civic engagement (Ellison & Vitak, 2015), and could include behavioral indicators of online civic involvement in addition to self-reported ones.

Declarations

Ethical approval: Not applicable

Consent to participate: Not applicable

Consent to publish: All authors have given consent to publish.

Competing interest: The authors have no competing interests to declare.

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